REMOVAL OF N-NITROSODIMETHYLAMINE (NDMA) FROM THE OHSWEKEN (SIX NATIONS) WATER SUPPLY

INTERIM REPORT

JULY 1993

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INTERIM REPORT
JULY 1993

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Ontario Ministry of the Environment and Energy

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ABSTRACT

N-nitrosodimethylamine (NDMA) levels above the Interim Maximum Acceptable Concentration of 0.009 μg/L (9 ppt) have been encountered in treated water from the Ohsweken water supply during winter months since monitoring began in 1989. NDMA has very rarely been detected in raw Grand River water. Studies conducted by Water Resources Branch Drinking Water Section Staff, commencing in February 1992, demonstrated that this compound could be formed by laboratory emulation of the plant treatment. Optimization of physical treatment processes yielded an improvement in treated water quality and a reduction, but not elimination of NDMA. Results of several laboratory studies aimed at inhibiting NDMA formation by alteration of conventional treatment methods have not consistently been successful. Ultraviolet irradiation is the only method examined to date which has consistently produced water with NDMA levels below detection. This report discusses the details of work conducted to date including the effectiveness and costs of implementation of ultraviolet light treatment.

INTRODUCTION

Detectable levels of N-nitrosodimethylamine (NDMA) have been encountered during routine monitoring of treated water from the Ohsweken water supply since December, 1989. NDMA has frequently been detected above the Ontario Drinking Water Objective Interim Maximum Acceptable Concentration of 0.009 μg/L or 9 parts per trillion. While NDMA has frequently been detected in treated water, particularly during winter months, corresponding raw Grand River water samples taken from the water plant intake have rarely yielded positive results.

A study commissioned by the Six Nations Band Council in 1990 suggested that the combination of chlorine and a polyelectrolyte coagulant aid used in the water treatment process may be responsible for the positive NDMA results (Child, 1990). Use of this polymer, a quaternary ammonium-based compound not commonly used in Ontario, was discontinued at Ohsweken in 1990. The theory that the polymer was involved in NDMA formation was weakened when subsequent monitoring revealed detectable levels of NDMA.

Following the reappearance of NDMA in the treated water from Ohsweken in January 1992 samples, Health and Welfare Canada requested assistance from Ministry of Environment and Energy (MOEE) Drinking Water Section (DWS) Staff in resolving this problem. An intensified monitoring program was established and the plant operation was reviewed. The purpose of the ensuing study was aimed at accomplishing several tasks including:

1) Verification of sampling methods to ensure that the values reported were representative;

2) Investigation of the reasons for the occurrence of, and inhibition of the formation of NDMA;

3) Examination of the plant treatment process and application of the results of inhibition studies aimed at identifying an easily-implemented solution to eliminate NDMA formation.

Subsequent monitoring has confirmed the frequent occurrence of NDMA throughout the Ohsweken distribution system. Laboratory simulation of plant treatment processes has demonstrated that this compound is being formed during treatment. Modification of the plant treatment process has yielded a substantial

improvement in the overall quality of treated water and a reduction (but not elimination) of detectable levels of NDMA. Studies conducted on-site at the Ohsweken plant and in the DWS laboratory have examined both conventional and advanced treatment techniques for eliminating or inhibiting the formation of this compound.

This report discusses the results of work aimed at finding a solution to the recurring detection of NDMA in the Ohsweken Water Supply. This study has consisted of several components including examination of treatment methods to inhibit NDMA formation, and evaluation of methods designed to eliminate NDMA after forming. The individual components of this study are outlined in the flowchart on page 4 of this report. Discussion of the results of two related reports, the 1992 DWSP Annual Report (MOEE, 1992) and the Ohsweken Water Plant Optimization Study (LeCraw, 1993), are not included in this report except where pertaining to NDMA.

SUMMARY AND CONCLUSIONS

- NDMA has frequently been detected in treated water from Ohsweken, however, it has rarely been observed in raw Grand River water samples. NDMA was detected in only 4 of a total of 62 raw water samples since the monitoring program began in December 1989.

- NDMA is produced by conventional water treatment techniques employed at the Ohsweken treatment plant. NDMA can also be formed by duplicating these techniques in the laboratory using Grand River water.

- NDMA is not a contaminant associated with the specific treatment chemicals used at the Ohsweken water plant. When using raw water from the Ohsweken plant intake, formation of this compound occurs regardless of the source of treatment chemicals.

- NDMA formation is not eliminated by alteration of the types of treatment chemicals or their points of application. Using raw water from Ohsweken, NDMA formation could not be suppressed by treatments using different oxidants, coagulants or chlorination strategies. No alternative method of

conventional treatment examined to date has been consistent at eliminating NDMA formation.

- Destruction of NDMA by Ultraviolet (UV) irradiation, an advanced oxidation process, is the only treatment examined to date which is capable of consistently reducing NDMA to levels below detection.

- Laboratory investigations using ultraviolet irradiation on NDMA-spiked treated water from the Ohsweken plant have been successful in reducing NDMA levels. These results indicated that NDMA can be reduced to non-detectable levels at an ultraviolet dosage of approximately 2.6 kWh/m^3 (10 kWh/1,000 US gallons).

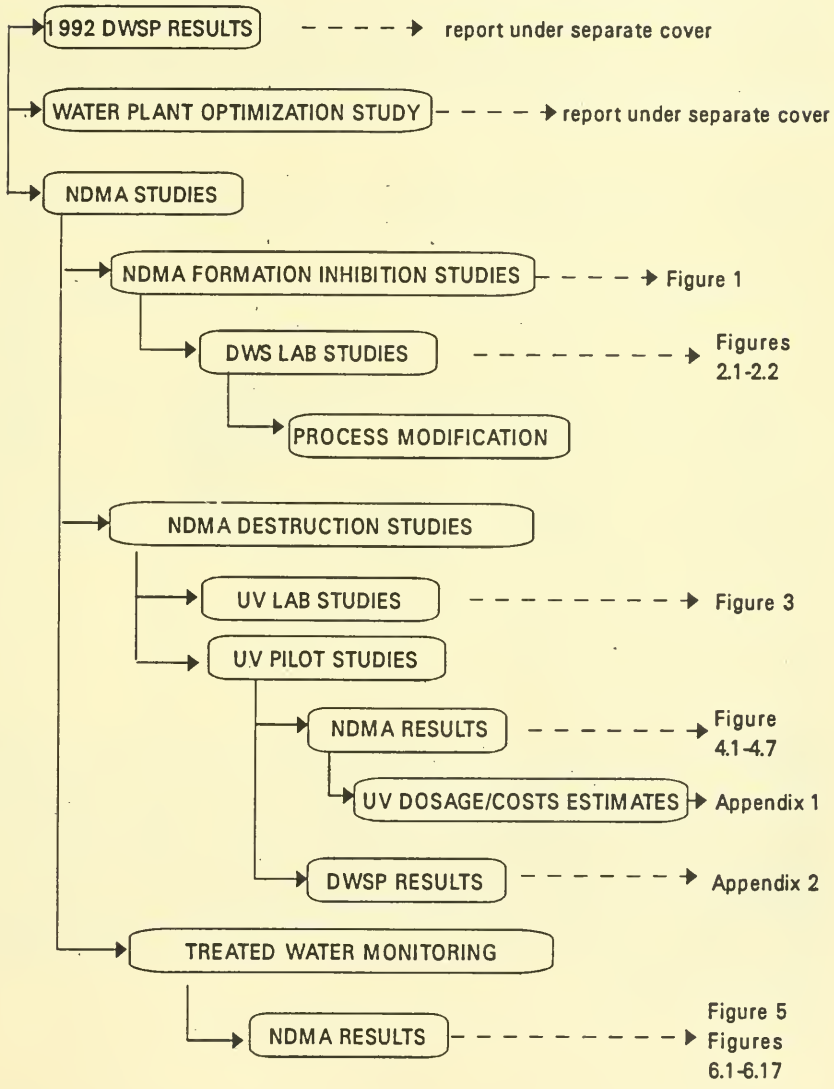
- On-site pilot work has confirmed the capability of UV irradiation at destroying NDMA. UV dosages required to eliminate NDMA under realistic plant conditions appear to be lower than predicted from lab work. During pilot-scale studies a UV dosage of 1.26 kWh/m^3 was sufficient for NDMA destruction. Comprehensive analyses of UV-irradiated water indicated that harmful by-products were not formed during treatment.

- Based on pilot-scale UV studies, a single 30 kW UV unit would be sufficient to treat average plant flows. Capital cost is estimated at $110,000 plus engineering costs. Operating costs for this type of unit are expected to be approximately $3,500 per year for power and lamp replacement, based on eight hour per day operation.

- During studies using ultraviolet - titanium dioxide (UV-TiO_2) treatment, only two runs exhibited pre-treatment NDMA levels of 10 ppt or greater. Based on this limited information, acceptable reduction of NDMA levels was not achieved.

- Fine-tuning of the plant operation has achieved an improvement in finished water quality. Further optimization of the existing process, following recommendations outlined in the Water Plant Optimization Study report, is an important step in continued remedial actions.

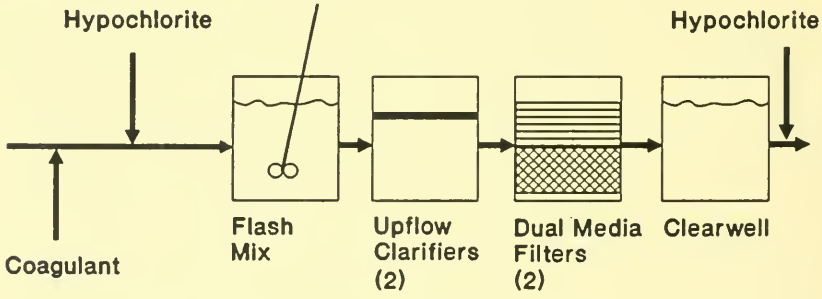
OHSWEKEN NDMA STUDY FLOWCHART



FORMATION INHIBITION STUDIES

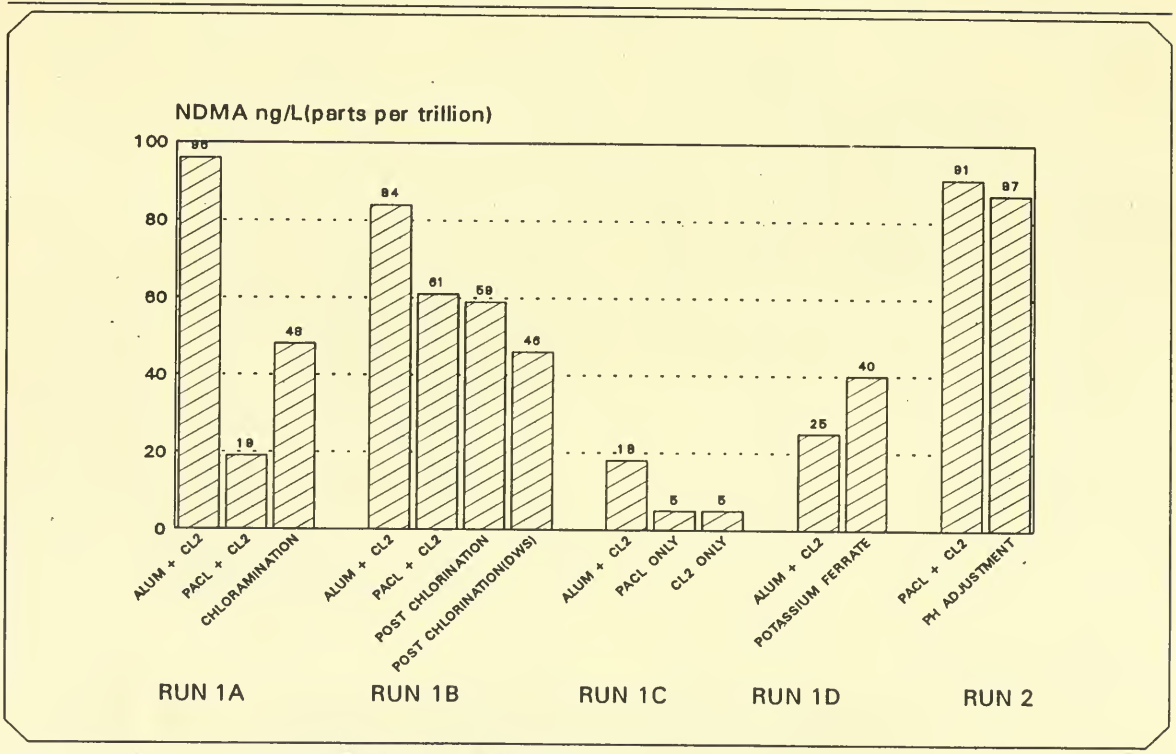
These studies were designed to examine alternative treatment methods that could be implemented without a large capital expenditure. By tailoring the jar test procedure to reflect plant conditions, several treatment changes were examined in the lab. A simple schematic of the Ohsweken plant process is shown below in Figure 1.

FIGURE 1 - OHSWEKEN PLANT TREATMENT PROCESS



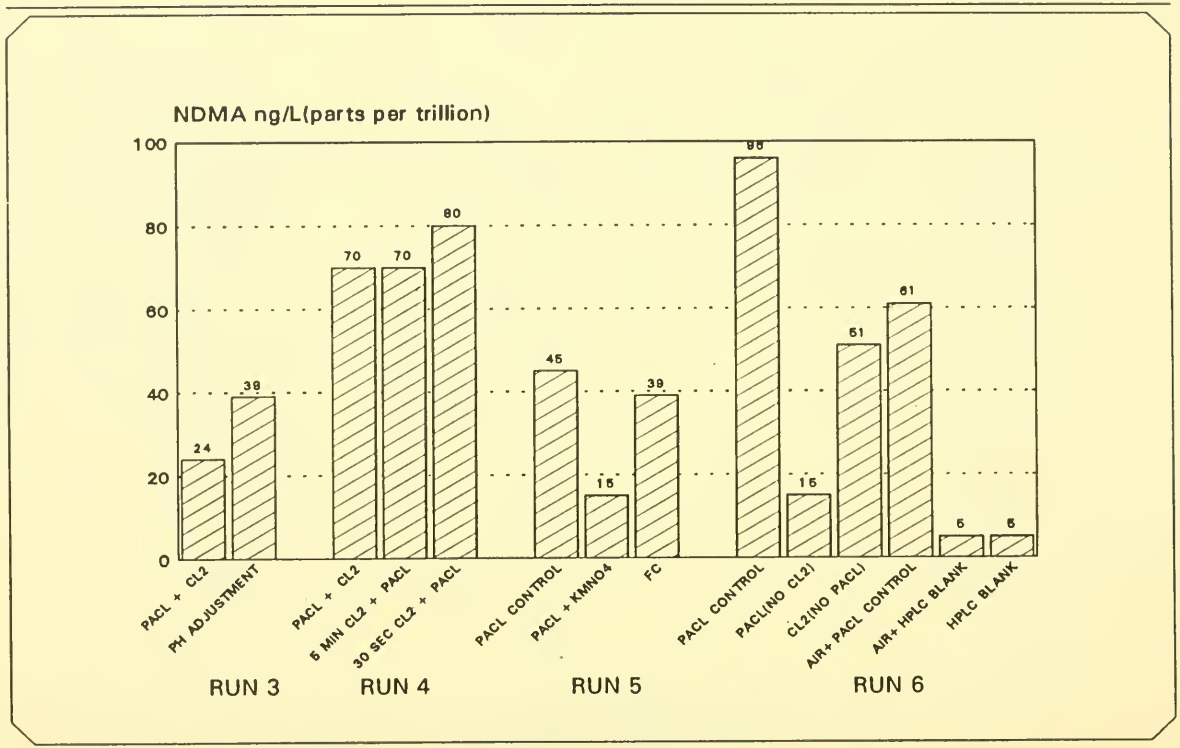
At an early stage in the study it was demonstrated that NDMA could be formed by laboratory simulation of the water plant operating conditions, using raw Grand River water collected from the plant intake. These treatments involved the addition of aluminum sulphate and sodium hypochlorite as used in the Ohsweken plant. Several attempts were made to inhibit NDMA formation by minor variations of the existing process. Figures 2.1 and 2.2 summarize the results of these formation inhibition studies conducted as of the end of May 1993. All reported results of NDMA analyses conducted for the NDMA laboratory studies represent an average of duplicate samples.

FIGURE 2.1 OHSWEKEN WATER SUPPLY
NDMA FORMATION INHIBITION STUDIES



MINIMUM DETECTION LIMIT - 5 NG/L, VALUES REPORTED AS 5 MAY BE LESS THAN 5

FIGURE 2.2 -OHSWEKEN WATER SUPPLY
NDMA FORMATION INHIBITION STUDIES



MINIMUM DETECTION LIMIT - 5 NG/L, VALUES REPORTED AS 5 MAY BE LESS THAN 5

The simulation of the plant treatment served as the control for the formation inhibition studies, since NDMA was not in the raw water. Treatment chemicals and conditions were altered in an attempt to identify a treatment regime that would not form NDMA. These control treatments are listed in Figure 2.1 as "alum + Cl2" or "PACL + Cl2"; PACL refers to polyaluminum chloride and Cl2 refers to sodium hypochlorite. Runs 1A through 1D were all conducted on the same batch of raw water. The ability to form NDMA in the laboratory under conditions very similar to the actual method of formation in the plant has been an important tool in investigating methods of inhibition.

The effect of altering the point of chlorination and the chlorine itself was examined. These runs, consisting of addition of coagulant, followed by conventional treatment and post-chlorination, are listed in Figure 2.1, Run 1B as "post-chlorination" and "post-chlorination (DWS)". The DWS refers to a source of chlorine different from the Ohsweken plant (the Drinking Water Section lab). From these results, it was demonstrated that NDMA is not specifically associated with contaminants in the chlorine used in Ohsweken.

The method of chlorination was thought to have the potential to affect NDMA formation. It was suggested that chloramination (creating a combined chlorine residual by adding ammonium sulphate before treatment) may eliminate the formation of NDMA. Results of these treatments, listed in Figure 2.1, Run 1A as "chloramination", did not indicate NDMA reduction when ammonium sulphate was added to create a combined chlorine residual.

Initial results using PACL following chlorination in place of aluminum sulphate as a primary coagulant appeared to significantly reduce NDMA formation. Subsequent results indicated a less significant reduction in NDMA formation when using PACL. The results of these analyses are listed as Run 1A and 1B in Figure 2.1. The primary coagulant in use at the plant was changed from alum to PACL in February, 1992 as PACL demonstrated an improvement in operation with respect to physical treatment.

In an attempt to explain the observed reduction in NDMA formation when using PACL in place of alum, it was proposed that the pH suppression created by treatment chemical addition assists in the reaction of dimethylamine (DMA) with

nitrite to form NDMA (Meresz, 1992; Dart, 1992; personal communication). The apparent reduction in NDMA levels when using PACL may have been due to the tendency of PACL to have less of an effect on pH than alum.

Based on the above premise, pre-treatment pH adjustment was examined. Soda ash (30 mg/L) was added prior to treatment in Runs 2 and 3, to buffer the pH suppression. Results of these runs did not yield a significant difference between pH-adjusted and control samples.

There is evidence that the potential of the raw water to form NDMA deteriorates, even during short-term storage in the dark at low temperatures. This observation has limited the confidence in results of laboratory studies which examined PACL and hypochlorite independently (Run 1C). Control treatments for Runs 1A through 1D (Figure 2.1), which used the same batch of raw water, showed a general decline in NDMA formation potential over the study period.

Potassium ferrate has been shown to reduce NDMA levels in wastewater (Bartzatt and Nagel, 1991). As evident from Run 1D data, potassium ferrate treatments yielded NDMA levels higher than in the control samples. This run was conducted prior to the availability of Run 1C results, due to the analytical time lag. The conclusions that can be drawn from this run are limited as a result of the apparent reduction of the raw water NDMA formation potential.

During the development of an analytical method for DMA, it was noted that chlorine (sodium hypochlorite) was capable of reducing levels of the suspected NDMA precursor, DMA (Meresz, 1992). Laboratory trials involving chlorination of DMA-spiked raw Grand River water followed by coagulant addition answered several questions. These trials, shown in Figure 2.1 as Run 4, involved the control treatment (coagulant addition followed by chlorination) and two different chlorine contact times prior to coagulant addition. Results of analyses did not indicate any significant difference between NDMA levels produced by adding chlorine first or by altering the chlorine contact time.

Results of Run 4 indicated that DMA-spiked raw Grand River water, when exposed to conventional treatment, was capable of forming NDMA. This helps to confirm the theory that DMA is a precursor, however, the exact mechanism of formation

remains unknown. Since DMA was artificially spiked, it is not possible to conclude that this NDMA formation mechanism is identical to that observed in the plant.

The DMA spike level used for Run 4 was approximately 0.35 mg/L, which may exceed typical DMA levels for Grand River water. Different chlorine contact times prior to coagulant addition did not appear to affect NDMA formation. Examination of the potential for chlorine to oxidize the DMA precursor may not have been adequate as the hypochlorite dosage used may not have been sufficient to oxidize the DMA.

Run 5 in Figure 2.2 shows the results of using an alternative disinfectant (potassium permanganate; $KMnO_4$) and an alternative coagulant (ferric sulphate). Raw Grand River water was spiked with 20 ppb (20 μg/L) DMA and subjected to plant treatment conditions in the DWS laboratory. The "PACL + KMNO4" treatment produced lower NDMA levels than the control, however, these levels remained above the 9 ppt guideline. Treatment using ferric sulphate was not significantly different from the control treatment.

Results of the effect of the treatment chemicals used independently and the effect of air stripping are shown in Figure 2.2, Run 6. As in Run 5, raw Grand River water was spiked with 20 ppb (20 μg/L) DMA and subjected to plant treatment conditions in the DWS laboratory. As indicated by "PACL CONTROL", 96 ppt NDMA was formed from this control treatment. Polyaluminum chloride, when used without chlorine (listed as "PACL (no CL2)") produced NDMA levels significantly lower than the control. Chlorine, when used without PACL (listed as "CL2 (no PACL)") also produced lower NDMA levels than the control treatment. Although significant reductions were observed, NDMA levels were not reduced below the 9 ppt guideline.

Certain volatile compounds are routinely removed from water by air stripping. Since DMA is a relatively volatile compound, attempts were made to remove this compound by purging a sample with air. DMA-spiked raw water was purged with clean compressed air through a quartz diffuser for 2 hours, followed by plant treatment chemical addition. A reduction from 96 ppt NDMA in the control to 61 ppt in the sample subjected to air purging was observed as outlined in Run 6.

Ultra-pure high performance liquid chromatography water (HPLC) subjected to air purging was used as a blank to confirm that the air used did not contain NDMA.

Numerous attempts were made to inhibit NDMA formation by altering treatment chemicals and techniques. Although reductions in NDMA formation were observed during several experimental runs, none of the treatment alternatives examined consistently produced water with NDMA levels below 9 ppt.

NDMA DESTRUCTION

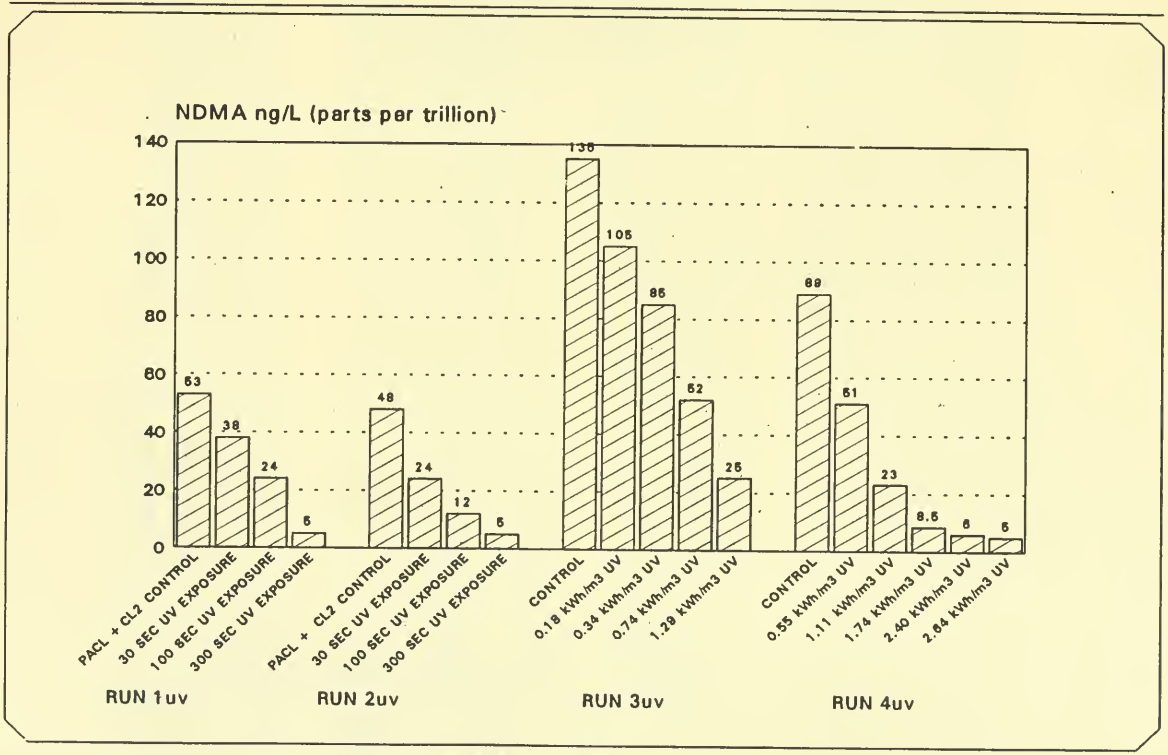
Laboratory-Scale UV Studies

Trials involving ultraviolet (UV) irradiation of samples containing NDMA resulted in dosage-dependant reduction of NDMA levels. In the first series of tests NDMA was generated by laboratory emulation of the plant process using raw Grand River water. The purpose of this work was to qualitatively determine the effect of UV light on NDMA. These studies, shown as Run 1uv and 2uv in Figure 3, involved batch treatments using a standard UV disinfection unit. Ultraviolet dosages were varied by the length of time of exposure; the longest exposure time yielded NDMA levels below detection.

Additional ultraviolet work was accomplished by spiking plant treated water with NDMA at levels comparable to peak levels observed during monitoring. Spiking was necessary as the formation potential in the raw water had diminished; NDMA could no longer be formed from plant treatment emulation.

An NDMA reduction was observed and quantified in terms of ultraviolet light dosage applied. These dosages, expressed as kilowatt hours per cubic meter, are shown as Run 3uv and 4uv in Figure 3. From Run 4uv, NDMA levels were reduced from 89 ppt to non-detectable (5 ppt detection limit) at ultraviolet dosages of approximately 2.6 kWh/m^3 (10 kWh/1,000 US gal). This information was helpful in determining equipment requirements for pilot and full-scale UV treatment at the Ohsweken plant.

FIGURE 3 - OHSWEKEN
NDMA DESTRUCTION - UV STUDIES



MINIMUM DETECTION LIMIT - 5 NG/L, VALUES REPORTED AS 5 MAY BE LESS THAN 5

Pilot-Scale UV Studies

NDMA Results

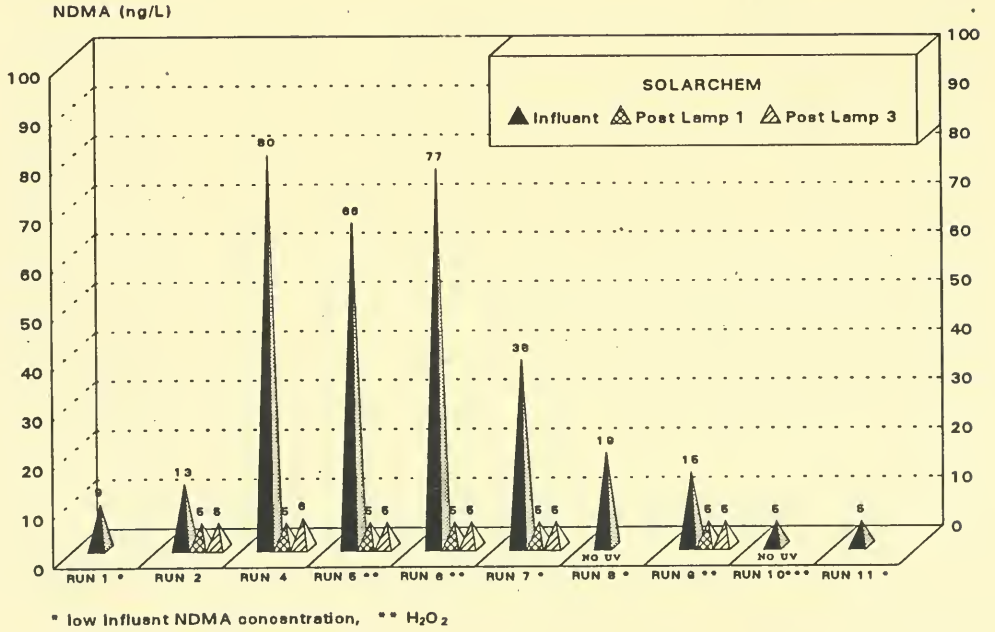
A pilot trial was deemed necessary as the quantification of NDMA destruction during UV studies had been based on data generated in the laboratory using NDMA-spiked water. A trial conducted on-site using treated water from the plant and a pilot-scale UV reactor was set up in mid-December, 1992. This trial, using a Solarchem UV unit rented from Environment Canada, was aimed at studying the effectiveness of UV technology on actual in-plant NDMA formation. At the request of Matrix Photocatalytic Ltd. (formerly Nutech Environmental) a study of a second UV technology using a titanium dioxide catalyst was initiated on March 5, 1993.

A total of 43 runs were conducted between December 14, 1992 and May 14, 1993. Results of these runs are presented in Figures 4.1 through 4.7. When NDMA levels in water feeding the UV equipment were below 10 ppt, UV-treated water samples were not analyzed. These runs are marked with a single asterisk beside the run number; hydrogen peroxide was used in certain runs as indicated by a double asterisk.

Results of these runs indicated that UV was successful at significantly reducing NDMA levels in each of the eleven runs conducted when influent NDMA levels were greater than 10 ppt. Non-detectable NDMA levels were reached in all runs except for the detection of 6 ppt NDMA on two occasions in UV-treated samples from influent waters containing NDMA at 80 ppt (Run 4) and 73 ppt (Run 31). These runs represented the maximum NDMA concentrations observed throughout the pilot study.

The effectiveness of hydrogen peroxide, which was used to enhance the oxidation capabilities of the UV light, was difficult to determine conclusively from this work. Runs 7 and 8 gave some indication that peroxide alone (in the absence of UV light) may yield a reduction in NDMA levels. Hydrogen peroxide, however, may significantly increase chlorine demand and feeding this chemical would involve additional equipment and maintenance.

Figure 4.1 OHSWEKEN
NDMA DESTRUCTION - UV STUDIES
Dec 14/15, 1992 - Jan 13, 1993

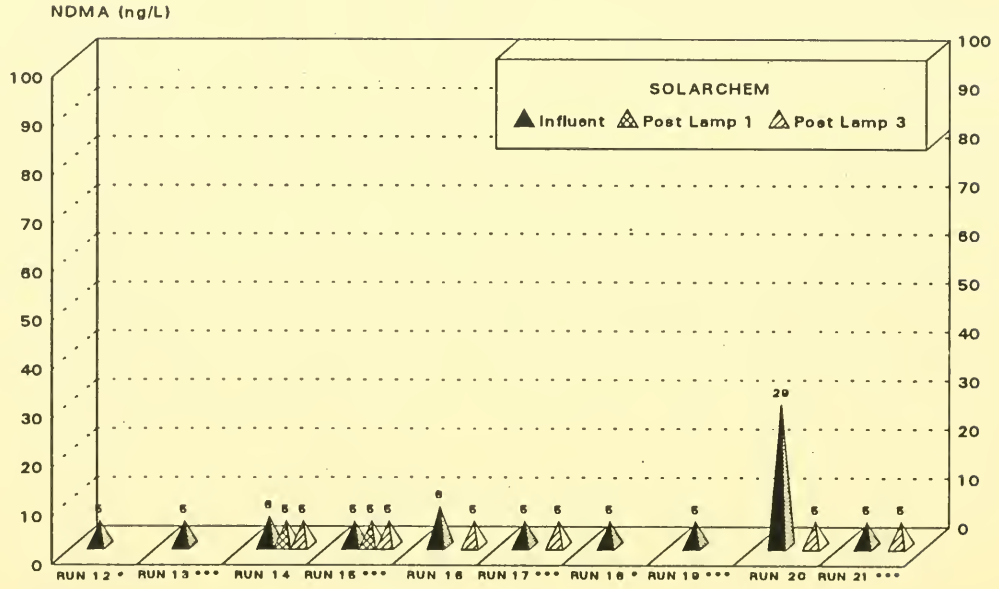


* low Influent NDMA concentration, ** H_2O_2

Figure 4.2

OHSWEKEN
NDMA DESTRUCTION - UV STUDIES

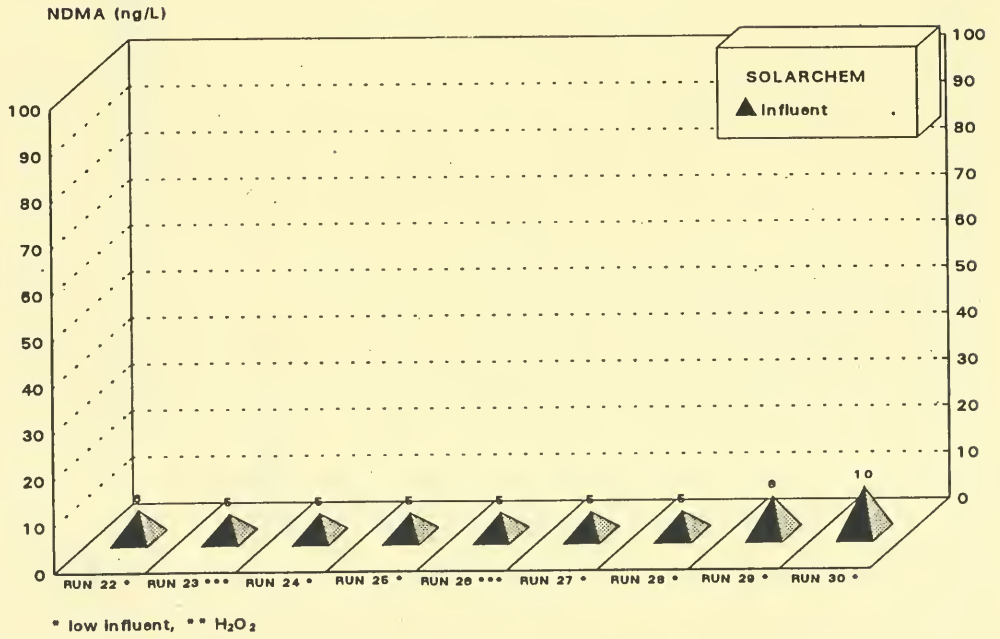
Jan 21/26 - Feb 5/10/18, 1993



* low influent NDMA concentration, ** H_2O_2

Figure 4.3 OHSWEKEN
NDMA DESTRUCTION - UV STUDIES

Feb 24 - Mar 2/4/9/11/18, 1993

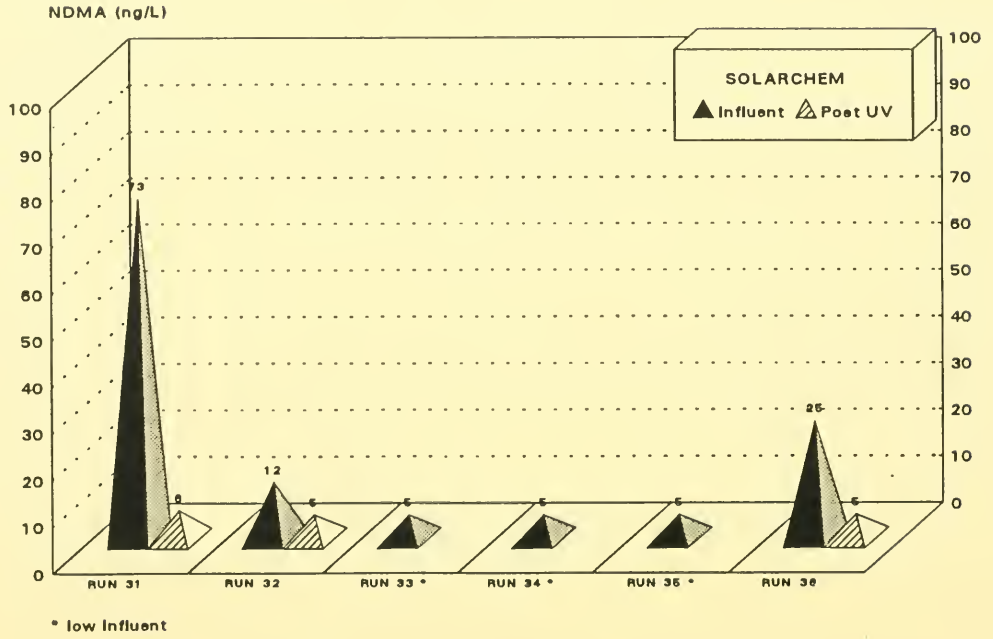


* low influent, ** H_2O_2

Figure 4.4

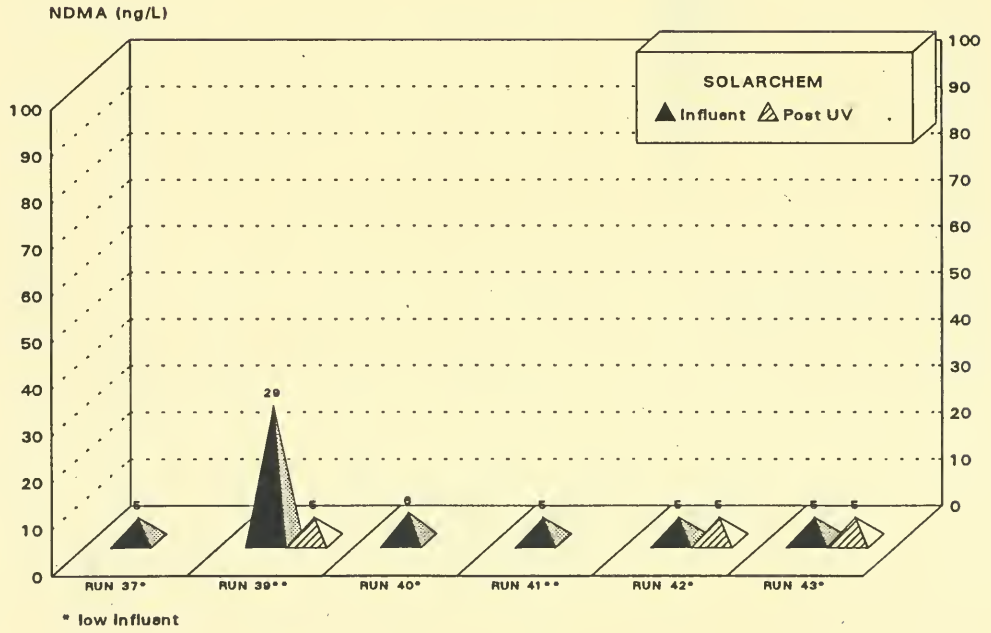
OHSWEKEN
NDMA DESTRUCTION - UV STUDIES

Mar 23/25/29/30 - Apr 07/14, 1993



* low Influent

Figure 4.5 OHSWEKEN
NDMA DESTRUCTION - UV STUDIES
Apr 20/22/27/29 - May 4/11 , 1993

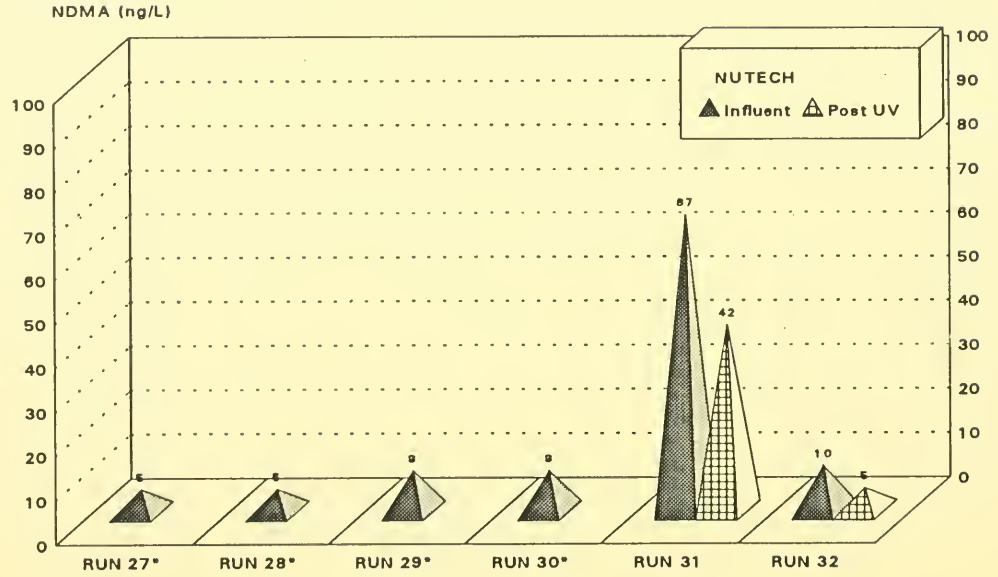


* low influent

Figure 4.6

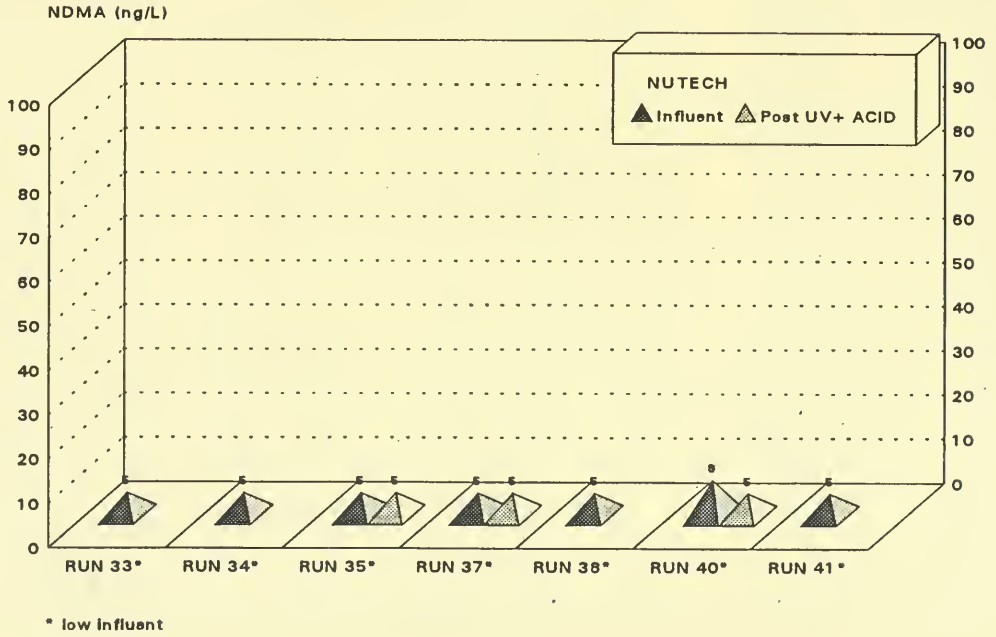
OHSWEKEN
NDMA DESTRUCTION - UV STUDIES

Mar 23/25/29/30 - Apr 07/14, 1993



* low influent

Figure 4.7 OHSWEKEN
NDMA DESTRUCTION - UV STUDIES
Mar 23/25/29/30 - Apr 07/14, 1993



* low influent

A total of thirteen runs were conducted using Nutech UV-TiO_2 equipment, as listed in Figures 4.6 and 4.7. Eleven of these runs had low influent NDMA concentrations. The highest observed NDMA level while using Nutech equipment was 67 ppt; this was reduced to 42 ppt following the UV-TiO_2 treatment.

Based on this limited information, acceptable reduction of NDMA levels was not achieved using UV-TiO_2 technology. Although the data was not sufficient to properly estimate the required capacity, a conservative 50 kW modular system was proposed as being adequate. Additional treatment may be required to remove carbonate and bicarbonate ions. A new version of this equipment is expected to increase efficiency by 50%.

Although UV-TiO_2 treatment does not appear to be effective in this particular application, other advantages of this treatment were noted. DWSP results for UV-TiO_2-treated water revealed significant reductions in residual aluminum levels.

This on-site pilot work has confirmed the findings of the laboratory studies, further demonstrating the capability of UV irradiation at destroying NDMA. Using the Solarchem unit, UV dosages required to eliminate NDMA under realistic plant conditions appear to be lower than predicted from lab work. During pilot work a UV dosage of 1.26 kWh/m^3 was sufficient for reduction of NDMA to levels below detection.

These apparent differences in UV efficiency between lab and pilot work may have resulted from the study conditions. Maximum NDMA levels encountered during pilot work were lower than those used in laboratory studies. More importantly, the pilot work examined NDMA formed under realistic conditions while lab work was conducted on NDMA-spiked water.

From the results of the pilot-scale work, a single 30 kW UV unit should be sufficient for destruction of NDMA at the levels observed, based on estimated plant flows of 20 m^3/hr. Maximum NDMA levels observed during pilot work were similar to maximum levels encountered in the treated water monitoring since process modifications were made in February, 1992. Should higher NDMA levels occur, an increased UV dosage could possibly be obtained by reducing plant flows and operating the plant over a longer period of time. Further NDMA reduction, in the

event that it would be necessary, may be attained by the addition of a stand-by hydrogen peroxide feed system. Should NDMA increase to levels that can not be treated by the above techniques, a second UV unit could be installed at the plant. Consideration should be given, during the installation of the initial unit, to the possibility of adding a second unit at a later date. The additional cost in providing for future installation of a second UV unit is expected to be minimal.

Details of dosage calculations and estimated capital and operating costs for UV and UV-TiO_2 equipment can be found in Appendix 1. These calculations are based on estimates; all figures must be verified by the consulting engineer.

DWSP Results

Drinking Water Surveillance Program (DWSP) samples were collected at the time of UV studies, on seven different dates between January and May, 1993. Analytical results for six of these sets of DWSP samples taken during UV work are presented in Appendix 2; results for samples collected in May 1993 were not available.

Samples of the raw and treated water were taken along with samples following exposure to the UV and UV-TiO_2 treatments. DWSP results for January and February 1993 reflect treatments using UV (listed as "POST LAMP 3") and UV with hydrogen peroxide ("POST LAMP 3 + H2O2"). Nutech equipment was set-up for March and April 1993 samples; for these dates the description "POST LAMP 3" refers to Solarchem equipment and "POST LAMP 3 + H2O2" results are for Nutech equipment.

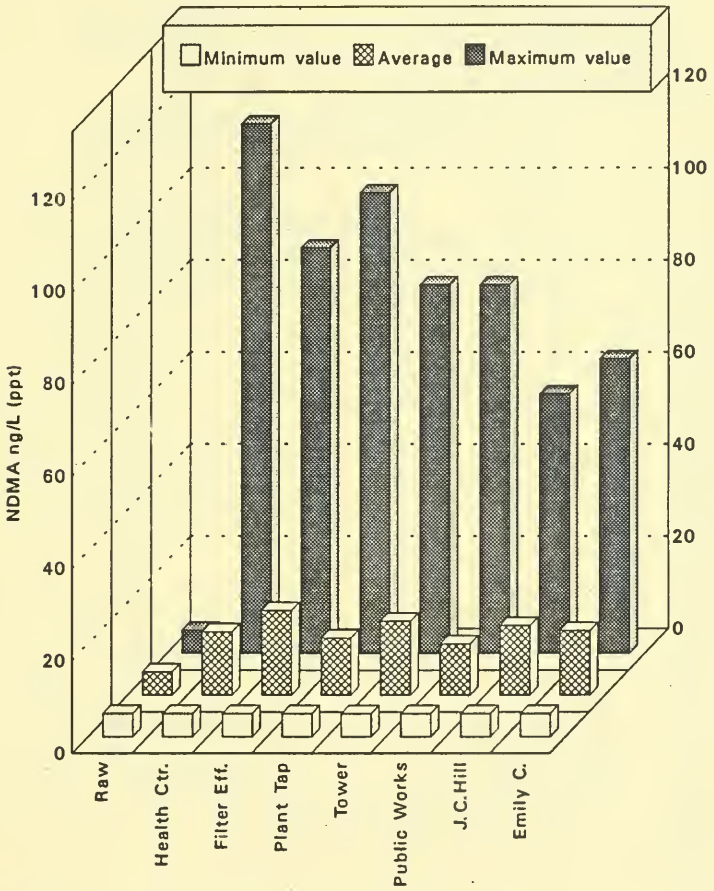
In addition to regular DWSP parameters, open characterization mass spectrometry scans were conducted. These scans, which are used to examine water samples for a very broad range of low level contaminants, are responsible for the original detection of NDMA. Open characterization analyses were intended to identify any unusual by-products that may have been produced by ultraviolet irradiation. Based on the results of all DWSP analyses received to date, there were no harmful compounds detected resulting from UV irradiation of the water.

TREATED WATER NDMA MONITORING

Intensive monitoring of the treated water for NDMA was conducted between January 1992 and May 1993. A total of 435 treated water samples were analyzed from various points in the Ohsweken distribution system. A summary of the maximum, minimum and average NDMA concentrations for each sample are presented in Figure 5. Individual sample results are plotted chronologically in Figures 6.1 to 6.17. Sample results reported as non-detectable are treated as 5 ppt.

As discussed previously, PACL replaced alum as the primary coagulant on February 17 1992. With the exception of the 2 school sites (J.C. Hill and Emily) the maximum NDMA levels reported for all other locations in Figure 5 occurred before the switch to PACL. The maximum NDMA levels observed since this coagulant change was 75 ppt during regular monitoring and 80 ppt during UV studies. The majority of remaining positive sample results indicated NDMA levels below 60 ppt.

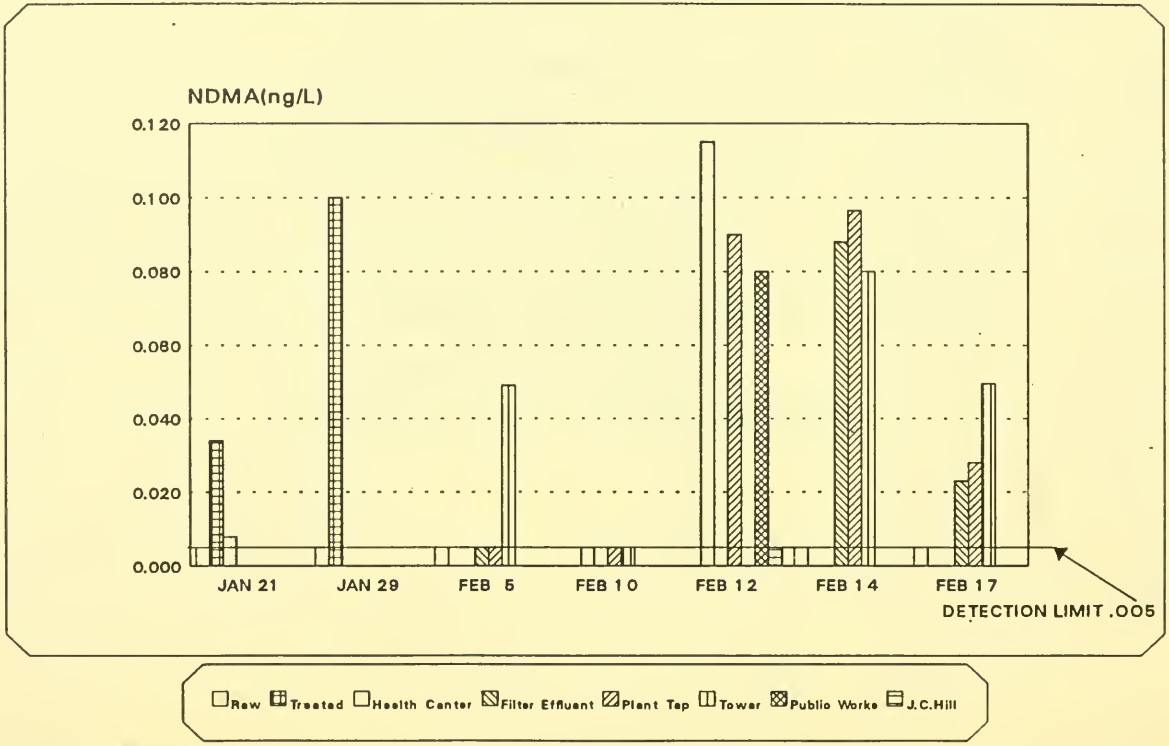
Figure 5.
NDMA Levels in the Ohsweken Water Supply
January 1992 - May 1993



Number of data	6	76	8	114	86	39	54	58
Maximum value	5	115	88	100	80	80	56.4	64
Averege	5	13.68	18.29	12.34	15.97	11.06	15.04	13.95
Minimum value	5	5	5	5	5	5	5	5

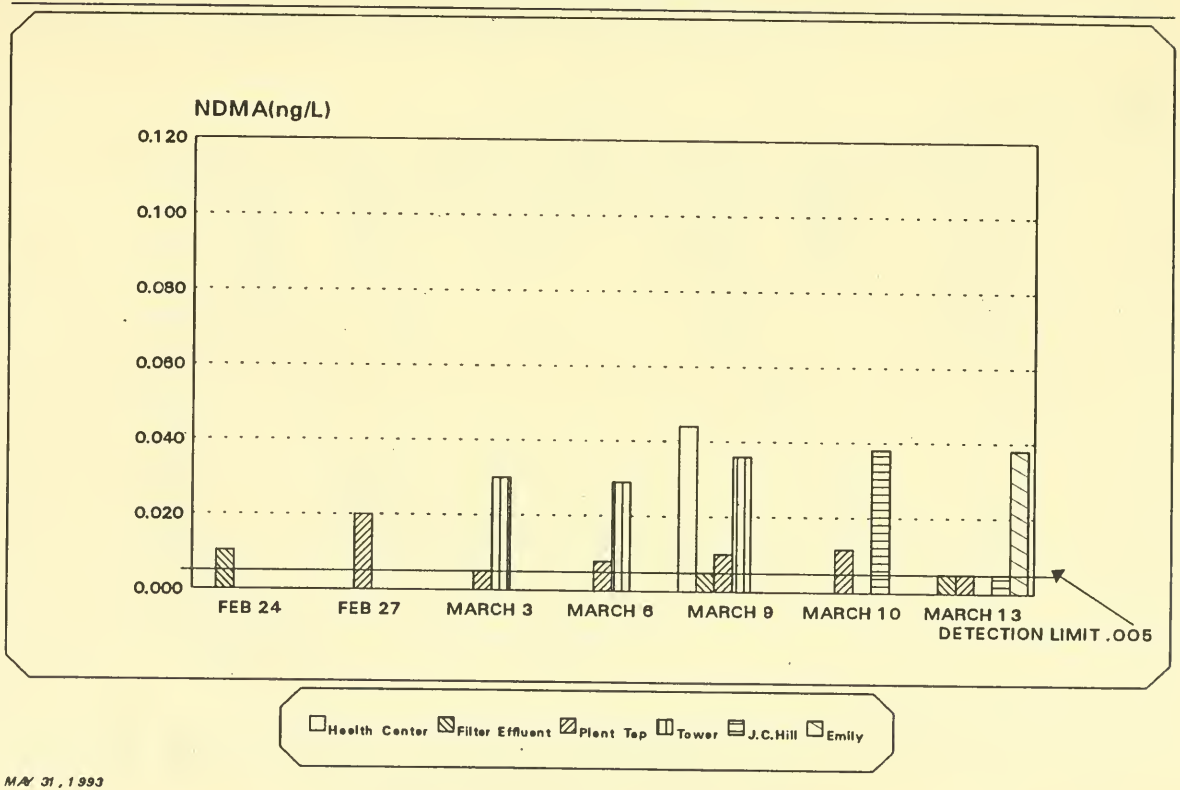
Sample locations

FIGURE 6.1: OHSWEKEN WATER SUPPLY
NDMA ANALYSIS 1992



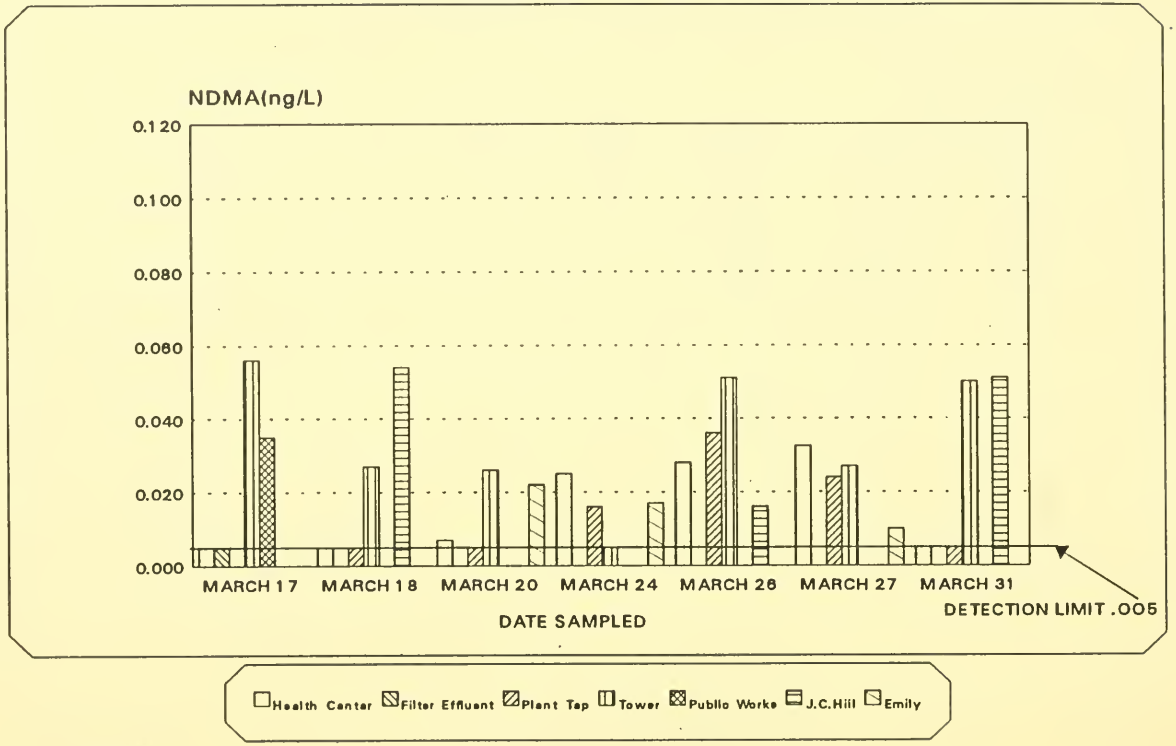
MOEE MAY 31,1993

FIGURE 6.2: OHSWEKEN WATER SUPPLY
NDMA ANALYSIS 1992



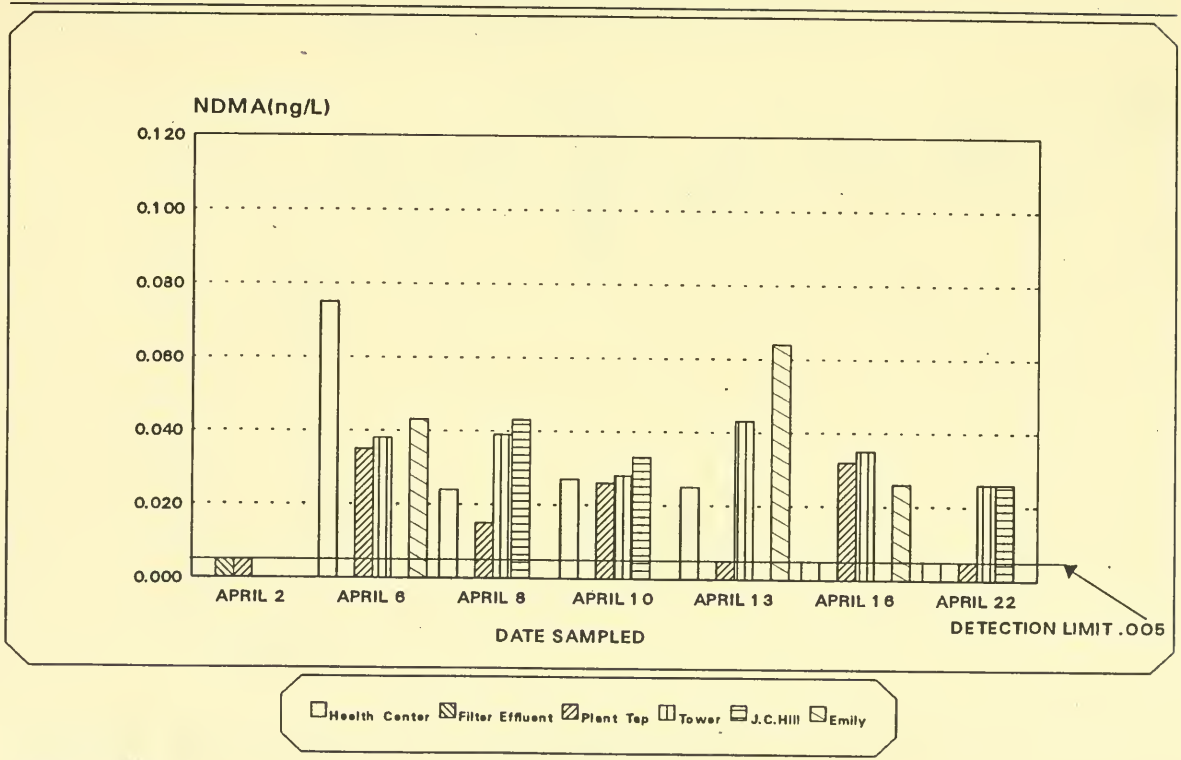
MAY 31, 1993

FIGURE 6.3: OHSWEKEN WATER SUPPLY
NDMA ANALYSIS 1992



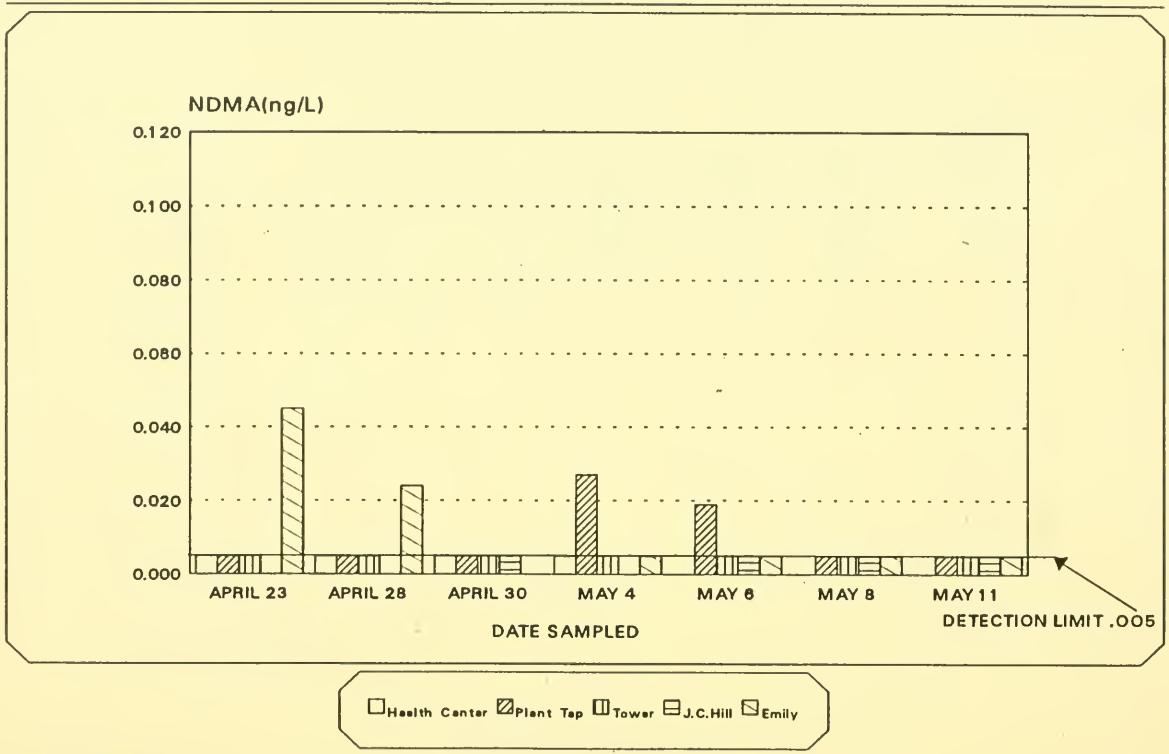
MOEE MAY 31 ,1 993

FIGURE 6.4: OHSWEKEN WATER SUPPLY
NDMA ANALYSIS 1992



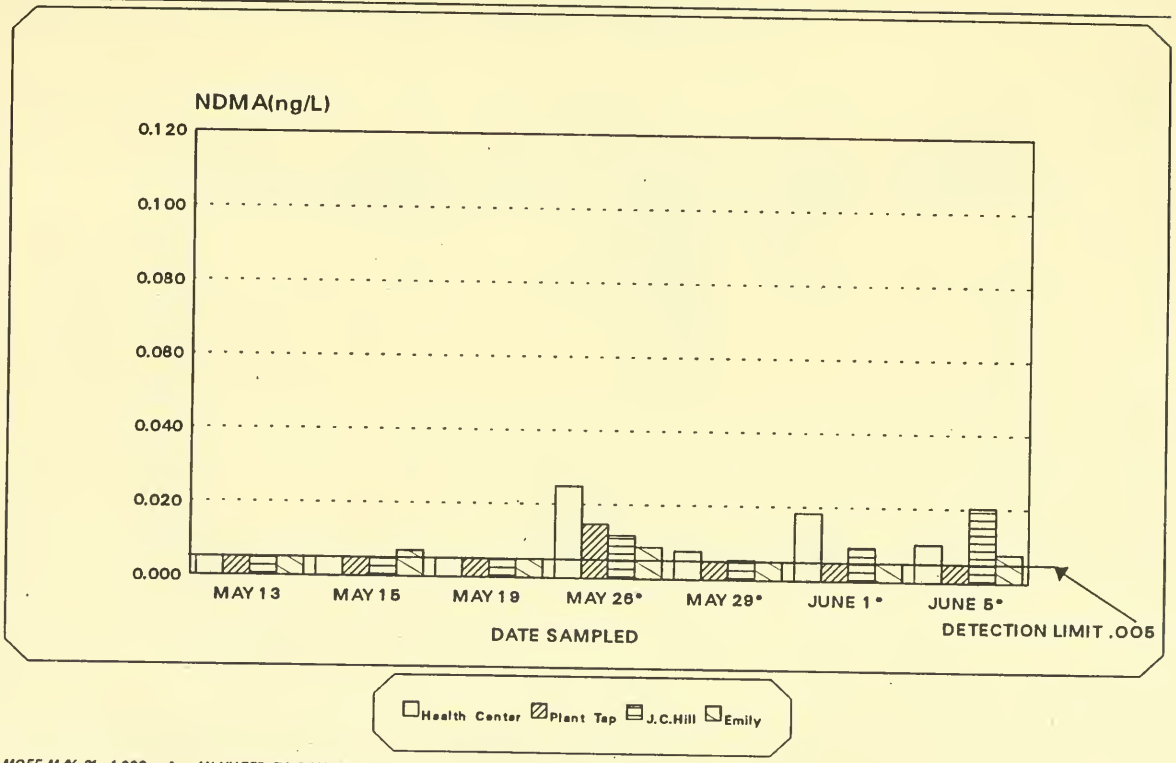
MOEE MAY 31, 1993

FIGURE 6.5: OHSWEKEN WATER SUPPLY
NDMA ANALYSIS 1992



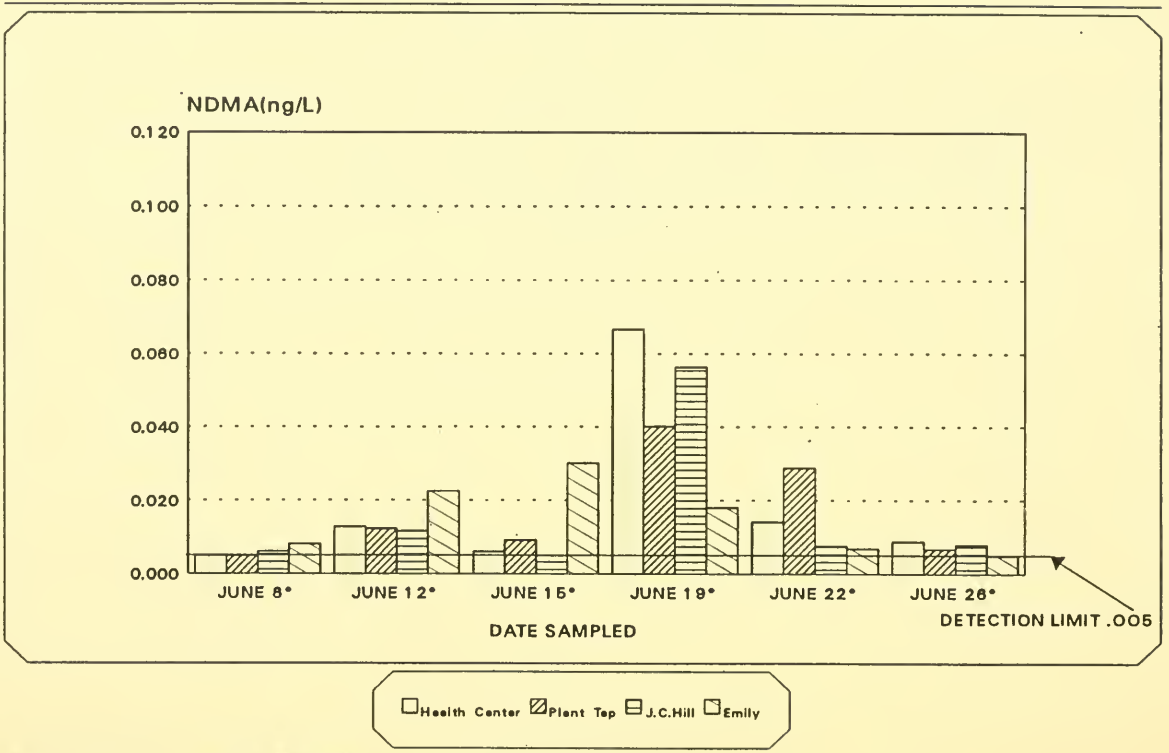
MOEE MAY 31, 1993

FIGURE 6.6: OHSWEKEN WATER SUPPLY
NDMA ANALYSIS 1992



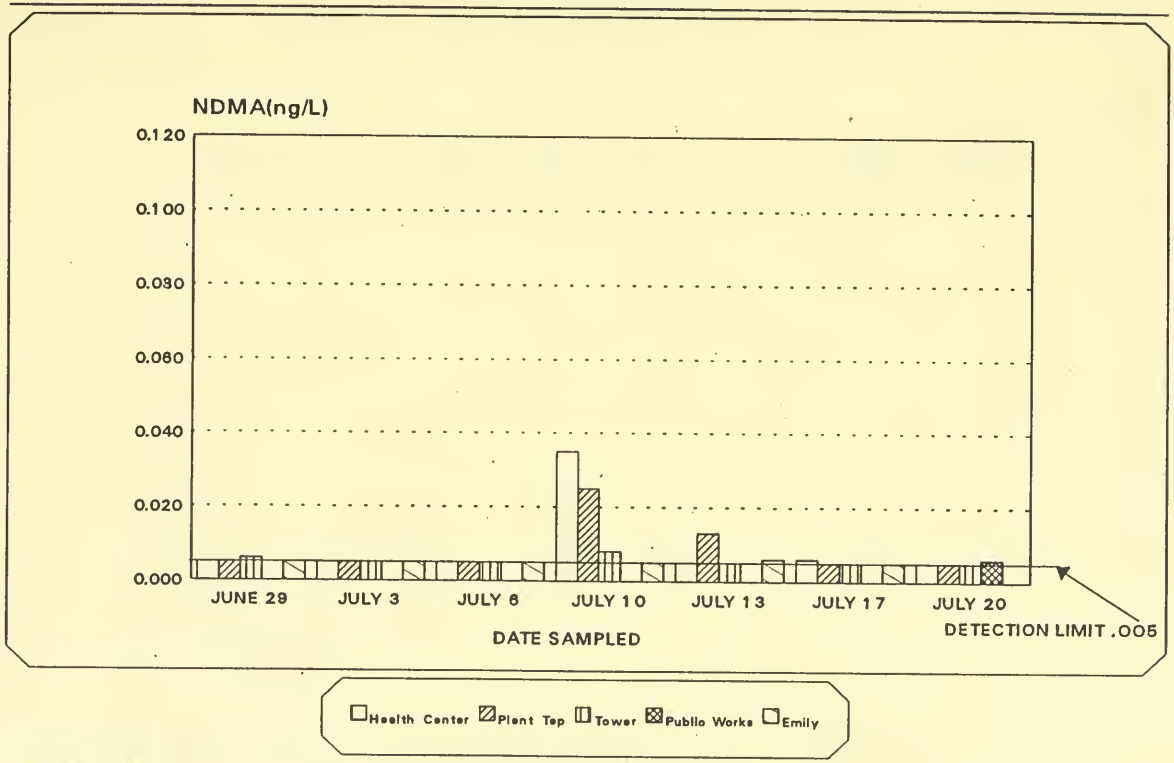
MOEE MAY 31, 1993 * - ANALYZED BY CANVIRO

FIGURE 6.7: OHSWEKEN WATER SUPPLY
NDMA ANALYSIS 1992



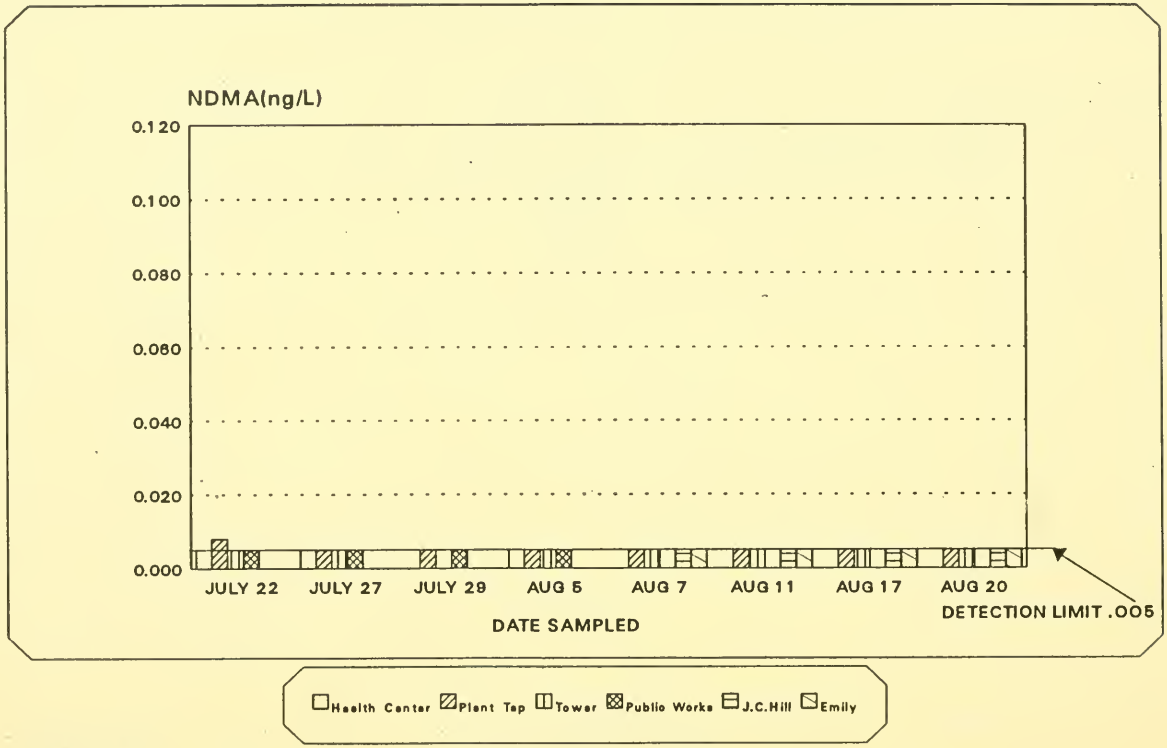
MOEE MAY 31, 1992 * - ANALYZED BY CANVIRO

FIGURE 6.8: OHSWEKEN WATER SUPPLY
NDMA ANALYSIS 1992



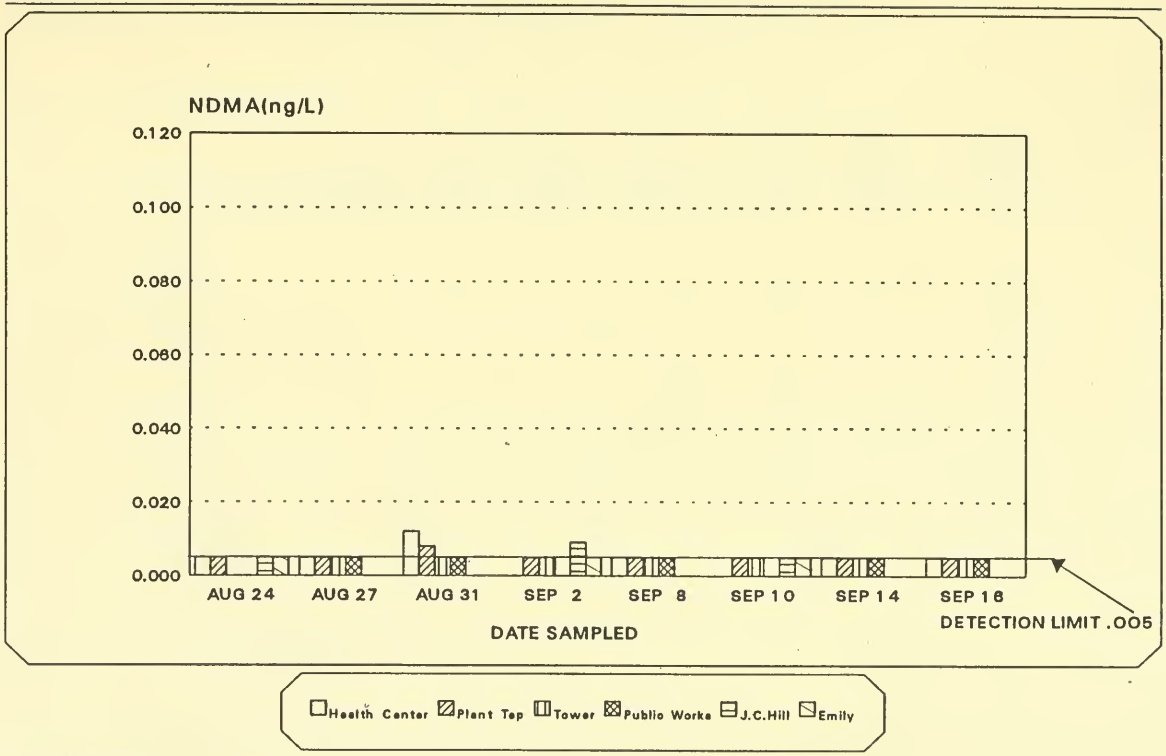
MOEE MAY 31, 1993

FIGURE 6.9:OHSWEKEN WATER SUPPLY
NDMA ANALYSIS 1992



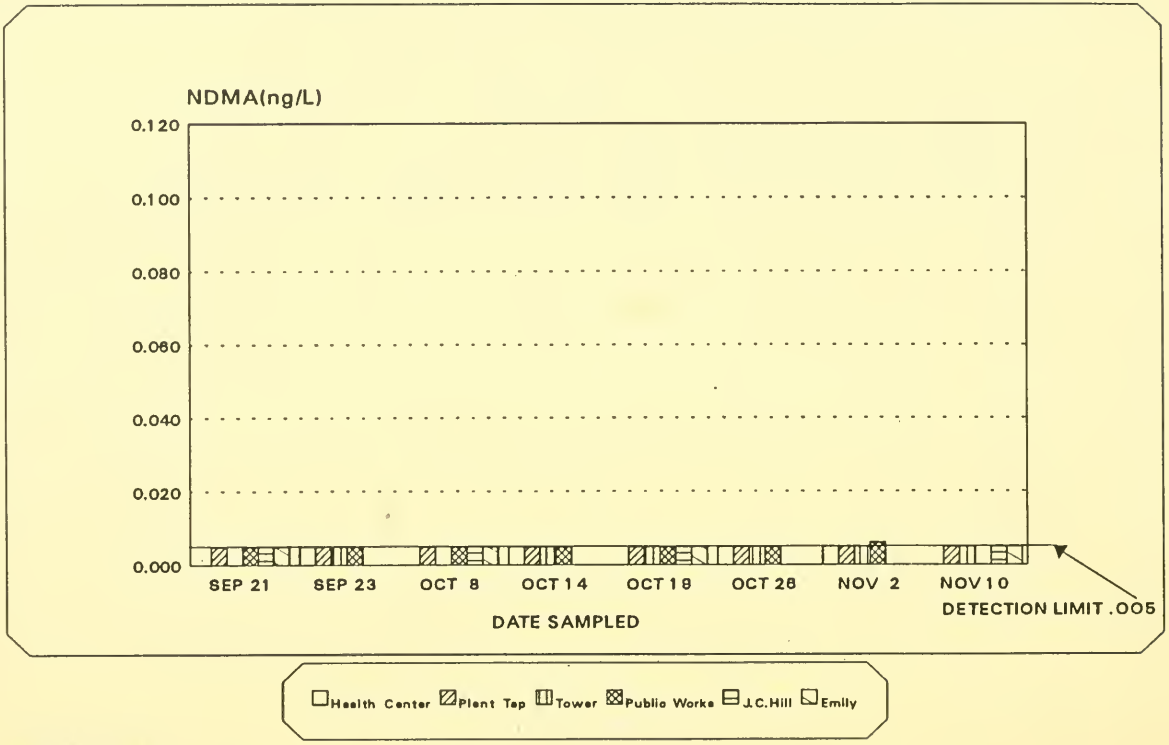
MOE MAY 31, 1993

FIGURE 6.10: OHSWEKEN WATER SUPPLY
NDMA ANALYSIS 1992



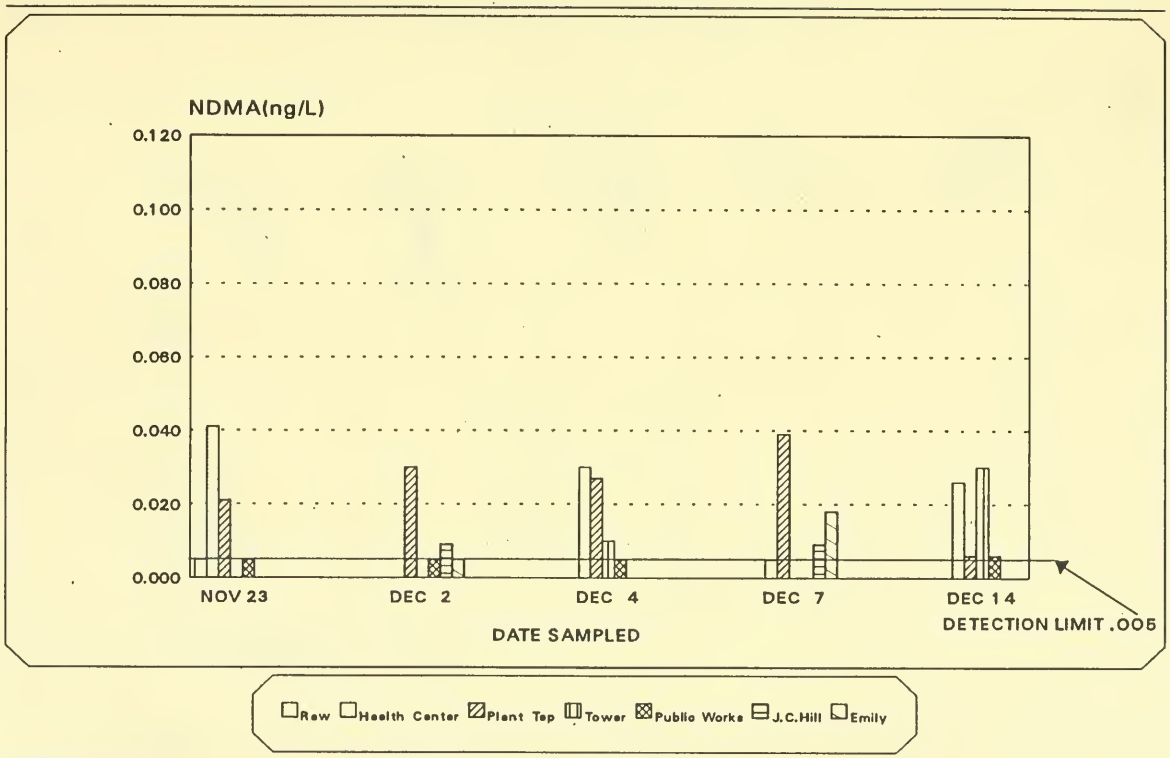
MOEE MAY 31, 1993

FIGURE 6.11:OHSWEKEN WATER SUPPLY
NDMA ANALYSIS 1992



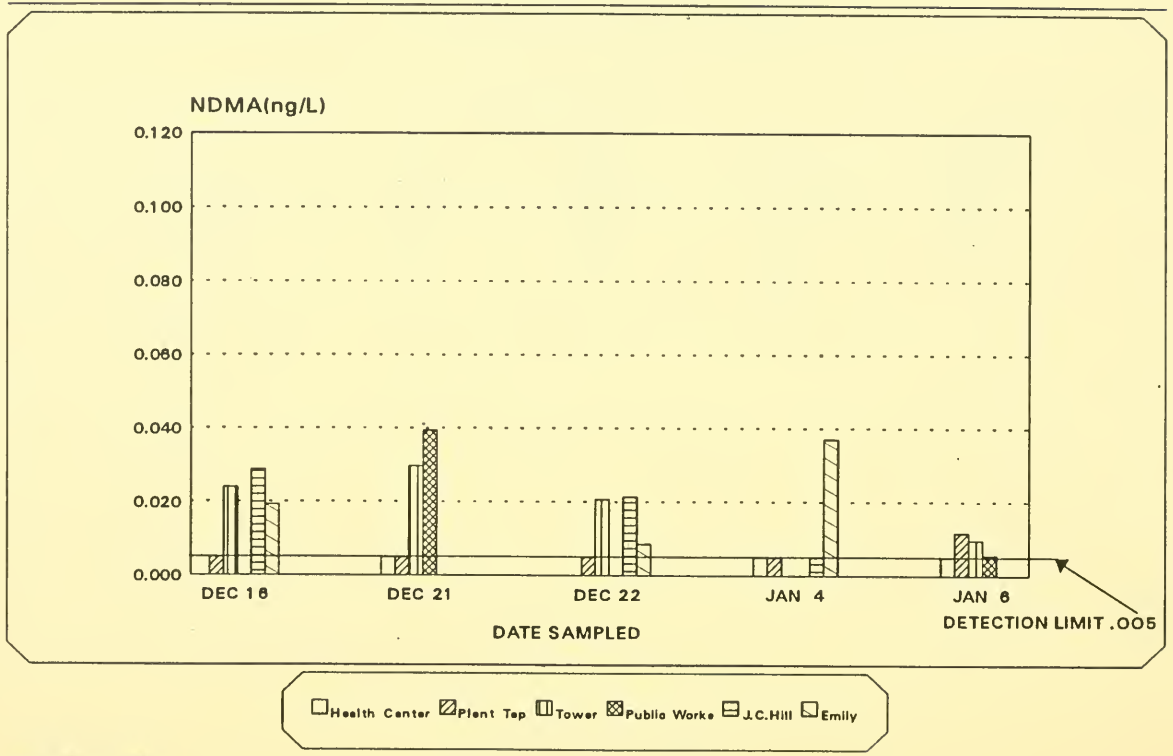
MOEE MAY 31, 1993

FIGURE 6.12: OHSWEKEN WATER SUPPLY
NDMA ANALYSIS 1992-93



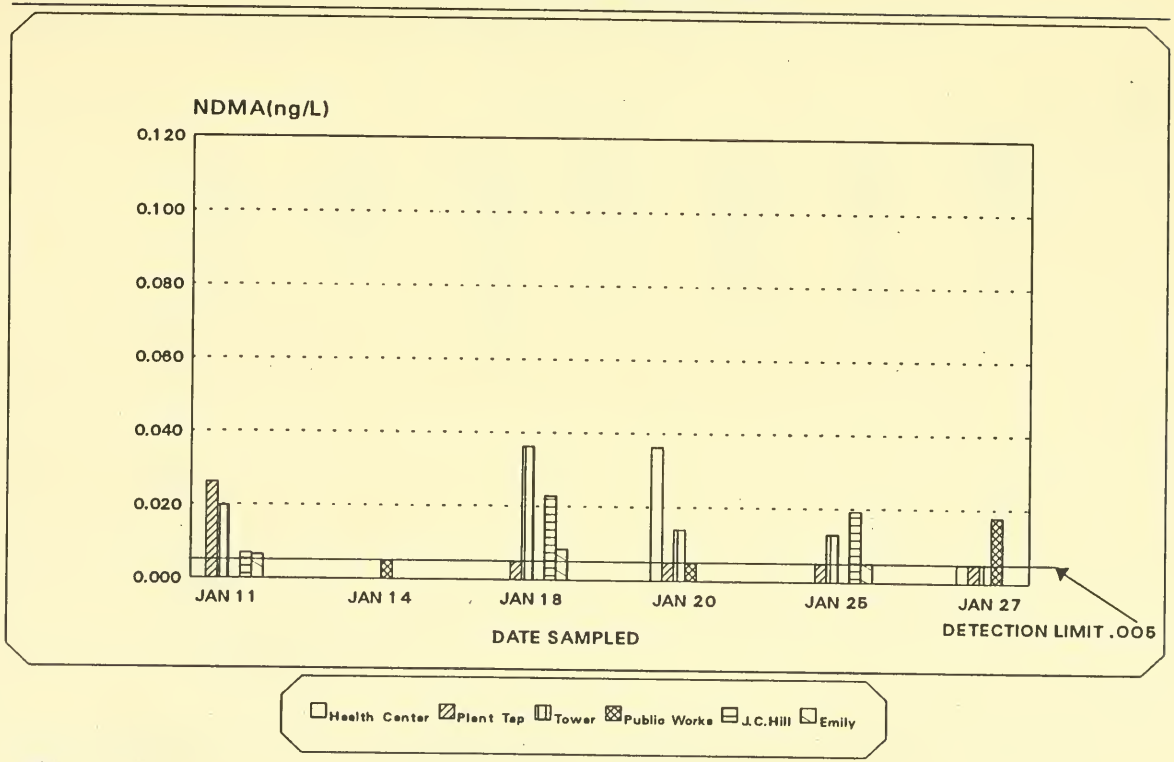
MCEE MAY 31, 1993

FIGURE 6.13: OHSWEKEN WATER SUPPLY
CANVIRO NDMA ANALYSIS 1992-93



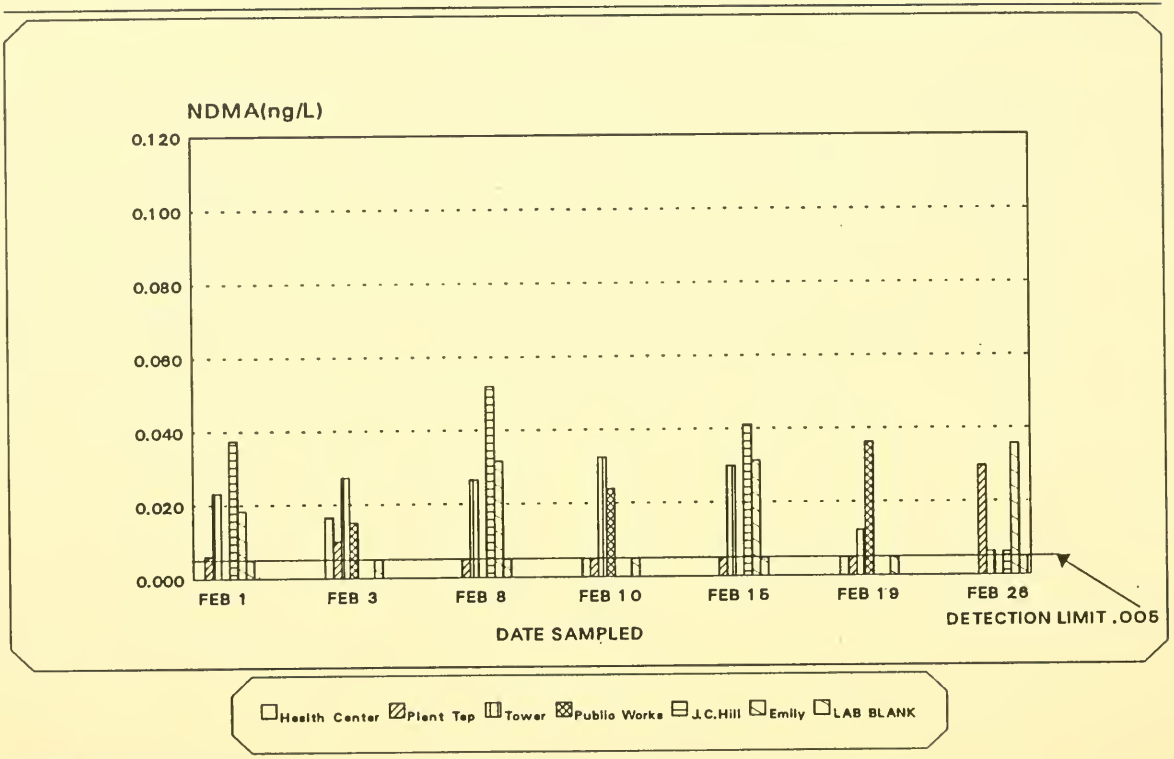
MOEE MAY 31, 1993

FIGURE 6.14: OHSWEKEN WATER SUPPLY
CANVIRO NDMA ANALYSIS 1993



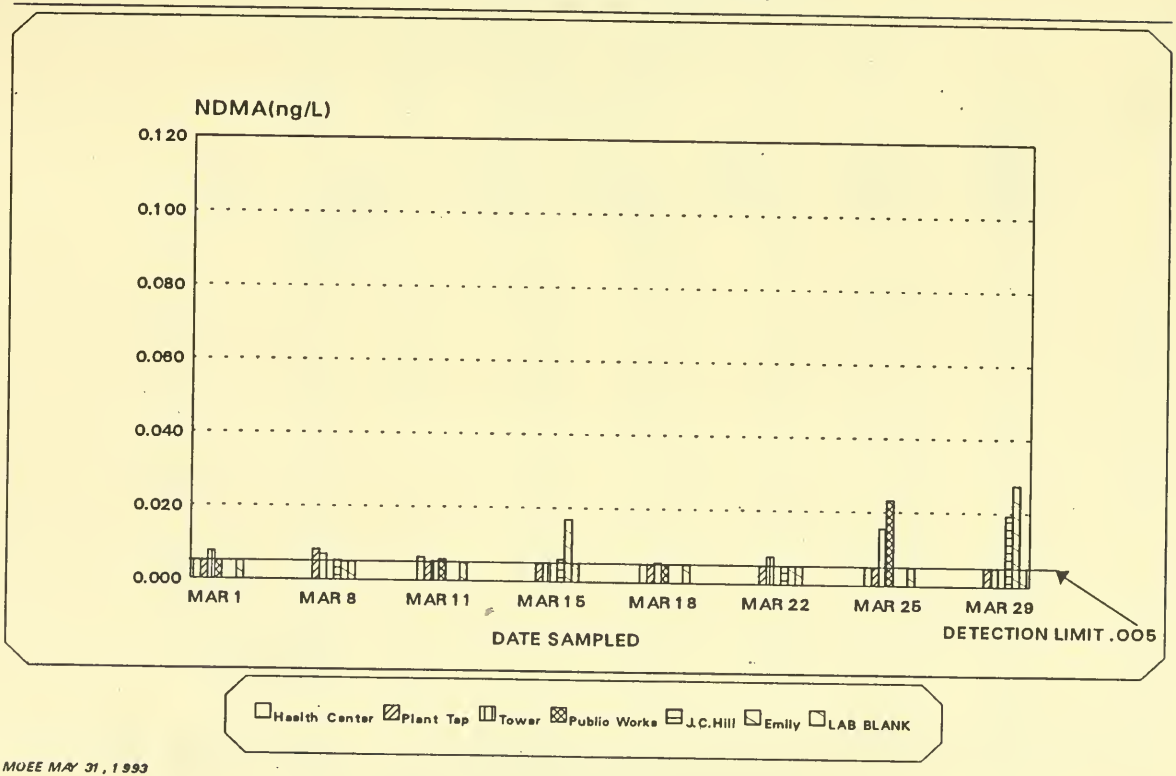
MOEE MAY 31, 1993

FIGURE 6.15: OHSWEKEN WATER SUPPLY
CANVIRO NDMA ANALYSIS 1993



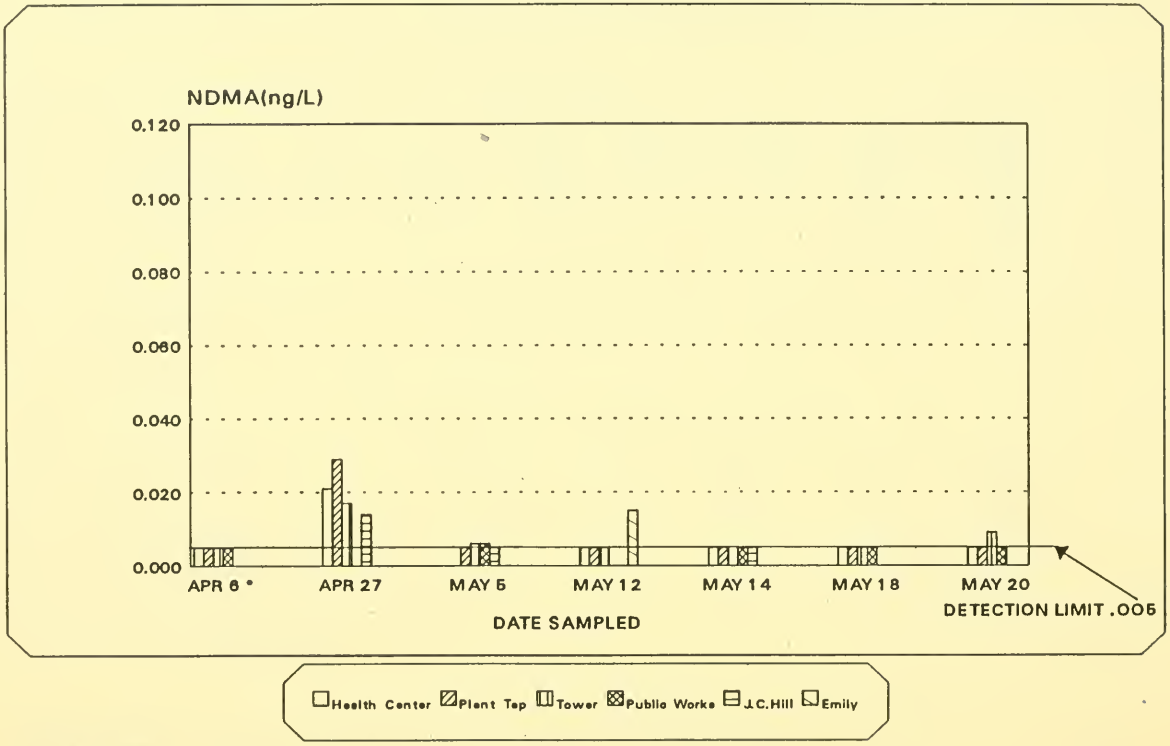
MOEE MAY 31, 1993

FIGURE 6.16: OHSWEKEN WATER SUPPLY
CANVIRO NDMA ANALYSIS 1993



MOEE MAY 31, 1993

FIGURE 6.17: OHSWEKEN WATER SUPPLY
LSB NDMA ANALYSIS 1993



MOEE MAY 31, 1993 * last sample Canviro

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Sutherland, Dale. 1992. Canviro Analytical Laboratories Ltd., Waterloo, Ontario.

APPENDIX 1. DOSAGE / COST CALCULATIONS FOR UV EQUIPMENT

1) Ultraviolet

Pilot Unit Flow: 25 usgal/min = approx 95 L/min = 5.7 m^3/hr

Pilot Unit dosage: (1 lamp)

$$\frac{7.2\ kW}{5.7\ m^3/hr} = 1.26\ kWh/m^3$$

When running at approximately 1.26 kWh/m^3 UV output the pilot unit was capable of reducing the maximum observed NDMA to levels below detection. This unit was hydraulically limited and higher flows (lower dosages) could not be examined.

Actual Plant Flow: 20 m^3/hr

1.26 kWh/m^3 * 20 m^3/hr = 25.2 kW UV capacity required

Based on pilot work, the estimated UV requirement of 25.2 kW should easily be handled by a 30 kW UV unit equipped to handle the typical plant flow of 20 m^3/hr.

APPROXIMATE COSTS

Unit Cost: $110,000 (including one-year limited warranty)

Operating Cost (hydro): (Based on 8 hr/day operation) $10/day

Lamp Replacement Cost: $3,000/yr (approximate)

Approximate Delivery: 6 to 12 weeks from order

These costs are estimated based on current information; more detailed estimates should be prepared pending approval of the installation. This estimate does not reflect engineering costs.

2) Ultraviolet-Titanium Dioxide

Data was insufficient for proper cost estimate. Based on limited information and effective dosage from UV equipment, estimated cost is $330,000 plus installation. The proposed system is modular; lesser capacity could be purchased and supplemented at a later date if required. A newer version of this equipment is expected to increase efficiency by 50%.

APPENDIX 2.

Drinking Water Surveillance Program Results

January 1993 - May 1993

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :230000174
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

			RAW TAP RAW WATER		TREATED TAP TREATED		POST LAMP 3 TREATED		POST LAMP 3 + H2O2 TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
BACTERIOLOGICAL	FECAL COLIFORM MF (CT/100ML)	93/01/14	10.000	<=	.		.		.	
		93/01/21	10.000	<	.		.		.	
		93/02/10	4.000		.		.		.	
		93/02/26	16.000		.		.		.	
		93/03/11	40.000		.		.		.	
		93/04/07	8.000		.		.		.	
		93/04/20	8.000		.		.		.	
	STANDRD PLATE CNT MF (CT/ML)	93/01/14	.		193.000		1.000	<=	1.000	<=
		93/01/21	.		.		13.000		.	
		93/02/10	.		8.000	<=	7.000	<=	3.000	<=
		93/02/26	.		19.000		.		7.000	<=
		93/03/11	.		1.000	<=	8.000	<=	12.000	
		93/04/07	.		33.000		16.000		.000	<=
		93/04/20	.		24.000		8.000	<=	58.000	
	T COLIFORM BCKGRD MF (CT/100ML)	93/01/14	93000.000		.		.		.	
		93/01/21	5100.000		.		.		.	
		93/02/10	3020.000		.		.		.	
		93/02/26	6400.000	A3C	.		.		.	
		93/03/11	14200.000		.		.		.	
		93/04/07	3600.000		.		.		.	
		93/04/20	16000.000		.		.		.	
	TOTAL COLIFORM MF (CT/100ML)	93/01/14	40000.000		.		.		.	
		93/01/21	3400.000		.		.		.	
		93/02/10	480.000		.		.		.	
		93/02/26	1280.000	A3C	.		.		.	
		93/03/11	4100.000		.		.		.	
		93/04/07	1100.000		.		.		.	
		93/04/20	5900.000		.		.		.	
CHEMISTRY (FIELD)	FLD CHLORINE (COMB) (MG/L)	93/01/21	.		.		.100		.	
		93/04/07	.		.100		.000		.000	
	FLD CHLORINE (TOTAL) (MG/L)	93/01/21	.		.		.100		.	
		93/04/07	.		.100		.000		.000	
	FLD CHLORINE FREE (MG/L)	93/01/21	.		.		.000		.	
		93/04/07	.		.000		.000		.000	

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :460000348
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
CHEMISTRY (FIELD)	FLD PH (DMNSLESS)	93/01/21	7.700		.		7.100		.	
		93/04/07	7.700		7.200		7.100		5.700	
	FLD TEMPERATURE (DEG.C)	93/04/07	.200		.		.500		.500	
	FLD TURBIDITY (FTU)	93/01/21	.		.		.200		.	
		93/04/07	.		.020		.200		.200	
CHEMISTRY (LAB)	ALKALINITY (MG/L)	93/01/14	220.600		180.800		181.100		188.900	
		93/01/21	266.100		.		232.600		.	
		93/02/10	269.800		227.600		224.700		226.500	
		93/02/26	273.500		240.400		.		239.600	
		93/03/11	244.300		204.800		203.700		203.600	
		93/04/07	216.100		172.900		174.700		172.300	
	AMMONIUM TOTAL (MG/L)	93/01/14	.046		.120		.038		.080	
		93/01/21	.004	<T	.		.008	<T	.	
		93/02/10	.356		.368		.308		.250	
		93/02/26	.398		.430		.		.354	
		93/03/11	.298		.268		.232		.272	
		93/04/07	.160		.170		.144		.168	
	CALCIUM (MG/L)	93/01/14	73.100		75.100		73.000		76.700	
		93/01/21	93.700		.		86.000		.	
		93/02/10	97.400		98.600		98.400		99.400	
		93/02/26	98.900		98.100		.		74.100	
		93/03/11	94.300		93.600		92.200		93.100	
		93/04/07	74.200		74.400		73.200		73.100	
	CHLORIDE (MG/L)	93/01/14	33.700		59.500		59.500		62.400	
		93/01/21	55.500		.		76.400		.	
		93/02/10	70.100		106.000		108.000		104.000	
		93/02/26	80.900		98.400		.		99.700	
		93/03/11	102.000		110.000		114.000		109.000	
		93/04/07	39.100		64.800		64.800		65.600	
	COLOUR (HZU)	93/01/14	20.000		5.000		7.000		1.500	
		93/01/21	15.000		.		6.000		.	
		93/02/10	8.000		2.000		4.000		2.000	
		93/02/26	9.500		3.000		.		4.500	
		93/03/11	11.500		2.500		5.000		3.000	

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :920000696
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H202	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
CHEMISTRY (LAB)	COLOUR (HZU)	93/04/07	17.000		4.000		6.000		3.000	
	CONDUCTIVITY (UMHO/CM)	93/01/14	553.000		586.000		588.000		615.000	
		93/01/21	732.000		.		748.000		.	
		93/02/10	783.000		828.000		828.000		827.000	
		93/02/26	850.000		864.000		.		864.000	
		93/03/11	924.000		954.000		950.000		948.000	
		93/04/07	573.000		598.000		600.000		596.000	
	CYANIDE (MG/L)	93/01/14	.		.001	<W	.018		.001	<W
		93/01/21	.		.		.001	<W	.	
		93/02/10	.		.001	<W	.001	<W	.001	<W
		93/02/26	.		.001	<W	.		.001	<W
		93/03/11	.		.001	<W	.001	<W	.001	<W
		93/04/07	.		.001	<W	.001	<W	.003	<T
	DISS ORG CARBON ()	93/01/14	4.300		2.500		2.200		1.900	
		93/01/21	4.100		.		1.900		.	
		93/02/10	3.600		2.000		1.900		1.800	
		93/02/26	3.200		2.000		.		1.900	
		93/03/11	3.500		2.000		1.800		1.800	
		93/04/07	4.000		1.800		1.800		1.800	
	FLUORIDE (MG/L)	93/01/14	.100		.060		.060		.060	
		93/01/21	.120		.		.060		.	
		93/02/10	.140		.040	<T	.060		.060	
		93/02/26	.140		.080		.		.080	
		93/03/11	.140		.060		.060		.080	
		93/04/07	.120		.060		.020	<T	.020	<T
	HARDNESS (MG/L)	93/01/14	261.000		267.000		262.000		275.000	
		93/01/21	336.000		.		316.000		.	
		93/02/10	352.000		356.000		355.600		358.000	
		93/02/26	360.600		358.100		.		299.000	
		93/03/11	335.000		334.000		330.000		333.000	
		93/04/07	260.000		261.000		259.000		256.500	
	IONCAL (OMNSLESS)	93/01/14	2.807		.308		2.607		1.298	
		93/01/21	1.448	NAF	.		4.718	NAF	.	
		93/02/10	3.378	NAF	5.550	NAF	5.342	NAF	4.267	NAF

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :690000522
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
CHEMISTRY (LAB)	IONCAL (DMNSLESS)	93/02/26	4.646		4.747		.		20.530	
		93/03/11	.501	NAF	4.815	NAF	2.824	NAF	4.942	NAF
		93/04/07	3.044		2.874		4.657		4.756	
		93/04/20	.563		.354		.272		.247	
	LANGELIERS INDEX (DMNSLESS)	93/01/14	1.092		.704		.672		.699	
		93/01/21	1.289	NAF	.		1.023	NAF	.	
		93/02/10	1.239		1.069		1.082		1.120	
		93/02/26	1.339		1.008		.		.925	
		93/03/11	1.245		.924		.935		.989	
		93/04/07	1.107		.639		.786		.790	
		93/04/20	1.200		.784		.868		.768	
	MAGNESIUM (MG/L)	93/01/14	19.000		19.400		19.300		20.200	
		93/01/21	24.800		.		24.500		.	
		93/02/10	26.300		26.700		26.600		26.600	
		93/02/26	27.500		27.400		.		27.700	
		93/03/11	24.300		24.400		24.300		24.100	
		93/04/07	18.200		18.200		18.400		17.900	
	NITRATE (TOTAL) (MG/L)	93/01/14	2.800		2.720		2.680		2.830	
		93/01/21	.525		.		.385		.	
		93/02/10	4.130		4.040		4.130		4.130	
		93/02/26	4.510		4.420		.		4.450	
		93/03/11	3.960		4.000		3.980		4.030	
		93/04/07	3.000		2.940		2.880		2.950	
	NITRITE (MG/L)	93/01/14	.154		.054		1.230		.350	
		93/01/21	.003	<T	.		.002	<T	.	
		93/02/10	.040		.002	<T	.560		.410	
		93/02/26	.096		.015		.		.570	
		93/03/11	.043		.003	<T	.590		.013	
		93/04/07	.043		.001	<T	.540		.011	
	NITROGEN TOT KJELD (MG/L)	93/01/14	.810		.540		.430		.390	
		93/01/21	.520		.		.580		.	
		93/02/10	.790		.690		.610		.580	
		93/02/26	.700		.760		.		.680	
		93/03/11	.780		.620		.560		.600	

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :920000696
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
CHEMISTRY (LAB)	NITROGEN TOT KJELD (MG/L)	93/04/07	.820		.460		.420		.440	
	PH (DMNSLESS)	93/01/14	8.350		8.040		8.020		8.010	
		93/01/21	8.370		.		8.200		.	
		93/02/10	8.300		8.200		8.220		8.250	
		93/02/26	8.390		8.120		.		8.160	
		93/03/11	8.370		8.130		8.150		8.200	
		93/04/07	8.370		8.000		8.150		8.160	
	PHOSPHORUS FIL REACT (MG/L)	93/01/14	.047		.002	<T	.001	<T	.005	
		93/01/21	.001	<W	.		.001	<W	.	
		93/02/10	.013		.001	<W	.001	<T	.009	
		93/02/26	.013		.001	<W	.		.001	<T
		93/03/11	.008		.001	<W	.001	<W	.001	<W
		93/04/07	.037		.001	<W	.001	<W	.001	<W
	PHOSPHORUS TOTAL (MG/L)	93/01/14	.094		.032		.032		.094	
		93/01/21	.058		.		.005	<T	.	
		93/02/10	.048		.004	<T	.007	<T	.037	
		93/02/26	.032		.002	<T	.		.008	<T
		93/03/11	.038		.004	<T	.004	<T	.002	<T
		93/04/07	.084		.012		.008	<T	.002	<T
	POTASSIUM (MG/L)	93/01/14	2.721		2.649		2.646		2.602	
		93/01/21	2.653		.		2.563		.	
		93/02/10	2.787		2.778		2.657		2.760	
		93/02/26	2.900		2.870		.		2.860	
		93/03/11	2.914		2.867		2.865		2.827	
		93/04/07	2.977		2.860		2.895		2.885	
	RESIDUE FILTRATE (MG/L)	93/01/14	359.000	CRO	381.000	CRO	382.000	CRO	400.000	CRO
		93/01/21	469.000		.		478.000		.	
		93/02/10	509.000	CRO	544.000		535.000		600.000	
		93/02/26	570.000		567.000		.		592.000	
		93/03/11	582.000		615.000		595.000		614.000	
		93/04/07	372.000	CRO	389.000	CRO	390.000	CRO	387.000	CRO
	SILICATES ()	93/02/10	3.160		3.080		3.080		3.080	
		93/02/26	3.160		2.940		.		2.920	
		93/03/11	2.700		2.480		2.460		2.460	

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :920000696
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE		REMARK		REMARK		REMARK		REMARK
		DATE	RESULT	CODE	RESULT	CODE	RESULT	CODE	RESULT	CODE
CHEMISTRY (LAB)	SILICATES ()	93/04/07	1.900		1.900		1.900		2.880	
	SODIUM (MG/L)	93/01/14	18.860		20.340		20.270		22.400	
		93/01/21	33.900		.		32.400		.	
		93/02/10	38.600		40.000		40.700		39.900	
		93/02/26	46.800		45.300		.		44.900	
		93/03/11	63.600		65.800		65.500		65.200	
		93/04/07	21.260		21.360		20.990		21.030	
	SULPHATE ()	93/01/14	34.340		40.250		41.050		42.420	
		93/01/21	58.530		.		63.310		.	
		93/02/10	68.780		77.980		77.090		76.830	
		93/02/26	81.580		84.830		.		84.420	
		93/03/11	75.480		82.060		81.930		80.420	
		93/04/07	36.700		43.700		44.450		43.560	
	TURBIDITY (FTU)	93/01/14	23.100		7.920	RRV	7.960	RRV	4.740	RRV
		93/01/21	10.600		.		.980		.	
		93/02/10	5.390		.230	<T	.360		.270	
		93/02/26	4.110		.200	<T	.		.320	
		93/03/11	5.270		.340		.140	<T	.100	<T
		93/04/07	13.500		.150	<T	.250		.870	
CHLOROAROMATICS	123-TRICHLOROBENZENE (NG/L)	93/01/14	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/01/21	5.000	<W	.		5.000	<W	.	
		93/02/10	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/02/26	5.000	<W	5.000	<W	.		5.000	<W
		93/03/11	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/04/07	5.000	<W	5.000	<W	5.000	<W	5.000	<W
	1234-TETCLOROBENZENE (NG/L)	93/01/14	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/02/26	1.000	<W	1.000	<W	.		1.000	<W
		93/03/11	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
	1235-TETCLOROBENZENE (NG/L)	93/01/14	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.000	<W	1.000	<W	1.000	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :690000522
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
CHLOROAROMATICS	1235-TETCLOROBENZENE (NG/L)	93/02/26	1.000	<W	1.000	<W	.		1.000	<W
		93/03/11	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
	124-TRICHLOROBENZENE (NG/L)	93/01/14	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/01/21	5.000	<W	.		5.000	<W	.	
		93/02/10	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/02/26	5.000	<W	5.000	<W	.		5.000	<W
		93/03/11	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/04/07	5.000	<W	5.000	<W	5.000	<W	5.000	<W
	1245-TETCLOROBENZENE (NG/L)	93/01/14	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/02/26	1.000	<W	1.000	<W	.		1.000	<W
		93/03/11	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
	135-TRICHLOROBENZENE (NG/L)	93/01/14	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/01/21	5.000	<W	.		5.000	<W	.	
		93/02/10	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/02/26	5.000	<W	5.000	<W	.		5.000	<W
		93/03/11	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/04/07	5.000	<W	5.000	<W	5.000	<W	5.000	<W
	236-TRICHLOROTOLUENE (NG/L)	93/01/14	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/01/21	5.000	<W	.		5.000	<W	.	
		93/02/10	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/02/26	5.000	<W	5.000	<W	.		5.000	<W
		93/03/11	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/04/07	5.000	<W	5.000	<W	5.000	<W	5.000	<W
	245-TRICHLOROTOLUENE (NG/L)	93/01/14	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/01/21	5.000	<W	.		5.000	<W	.	
		93/02/10	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/02/26	5.000	<W	5.000	<W	.		5.000	<W
		93/03/11	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/04/07	5.000	<W	5.000	<W	5.000	<W	5.000	<W
	26A-TRICHLOROTOLUENE (NG/L)	93/01/14	5.000	<W	5.000	<W	5.000	<W	5.000	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :460000348
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
CHLOROAROMATICS	26A-TRICHLOROTOLUENE (NG/L)	93/01/21	5.000	<W	.		5.000	<W	.	
		93/02/10	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/02/26	5.000	<W	5.000	<W	.		5.000	<W
		93/03/11	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/04/07	5.000	<W	5.000	<W	5.000	<W	5.000	<W
	HEXACHLOROBENZENE (NG/L)	93/01/14	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/02/26	1.000	<W	1.000	<W	.		1.000	<W
		93/03/11	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
	HEXACHLOROBUTADIENE (NG/L)	93/01/14	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/02/26	1.000	<W	1.000	<W	.		1.000	<W
		93/03/11	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
	HEXACHLOROETHANE (NG/L)	93/01/14	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/02/26	1.000	<W	1.000	<W	.		1.000	<W
		93/03/11	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
	OCTACHLOROSTYRENE (NG/L)	93/01/14	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/02/26	1.000	<W	1.000	<W	.		1.000	<W
		93/03/11	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
	PENTACHLOROBENZENE (NG/L)	93/01/14	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/02/26	1.000	<W	1.000	<W	.		1.000	<W
		93/03/11	1.000	<W	1.000	<W	1.000	<W	1.000	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :920000696
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
CHLOROAROMATICS	PENTACHLOROBENZENE (NG/L)	93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
CHLOROPHENOLS	234-TRICHLOROPHENOL (NG/L)	93/01/14	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/01/21	100.000	<W	.		100.000	<W	.	
		93/02/10	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/02/26	100.000	<W	100.000	<W	.		100.000	<W
		93/03/11	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/04/07	100.000	<W	100.000	<W	100.000	<W	100.000	<W
	2345-TETCHLOROPHENOL (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/02/26	20.000	<W	20.000	<W	.		20.000	<W
		93/03/11	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W
	2356-TETCHLOROPHENOL (NG/L)	93/01/14	10.000	<W	10.000	<W	10.000	<W	10.000	<W
		93/01/21	10.000	<W	.		10.000	<W	.	
		93/02/10	10.000	<W	10.000	<W	10.000	<W	10.000	<W
		93/02/26	10.000	<W	10.000	<W	.		10.000	<W
		93/03/11	10.000	<W	10.000	<W	10.000	<W	10.000	<W
		93/04/07	10.000	<W	10.000	<W	10.000	<W	10.000	<W
	245-TRICHLOROPHENOL (NG/L)	93/01/14	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/01/21	100.000	<W	.		100.000	<W	.	
		93/02/10	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/02/26	100.000	<W	100.000	<W	.		100.000	<W
		93/03/11	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/04/07	100.000	<W	100.000	<W	100.000	<W	100.000	<W
	246-TRICHLOROPHENOL (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	30.000	<T	20.000	<W	20.000	<W
		93/02/26	30.000	<T	30.000	<T	.		20.000	<W
		93/03/11	20.000	<T	30.000	<T	20.000	<W	20.000	<T
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W
	PENTACHLOROPHENOL (NG/L)	93/01/14	30.000	<T	10.000	<W	10.000	<W	10.000	<W
		93/01/21	10.000	<T	.		10.000	<W	.	
		93/02/10	10.000	<W	10.000	<T	10.000	<W	10.000	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :690000522
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
CHLOROPHENOLS	PENTACHLOROPHENOL (NG/L)	93/02/26	10.000	<W	10.000	<W	.		10.000	<W
		93/03/11	10.000	<W	10.000	<W	10.000	<W	10.000	<W
		93/04/07	10.000	<W	10.000	<W	10.000	<W	10.000	<W
METAL SCAN	ALUMINUM (UG/L)	93/01/14	240.000		4350.000	RRV	4590.000	RRV	3050.000	RRV
		93/01/21	150.000		.		920.000	RRV	.	
		93/02/10	2000.000		290.000	RRV	300.000		300,000	
		93/02/26	79.000		230.000	RRV	.		440.000	
		93/03/11	82.000		190.000	RRV	140.000		15.000	
		93/04/07	.000	!WP	98.000		120.000		2.200	
	ANTIMONY (UG/L)	93/01/14	.440	<T	.650		.660		.490	<T
		93/01/21	.420	<T	.		.370	<T	.	
		93/02/10	.490	<T	.510		.550		.480	<T
		93/02/26	.340	<T	.410	<T	.		.490	<T
		93/03/11	.430	<T	.420	<T	.590		.530	
		93/04/07	.000	!WP	.540		.600		.500	<T
	ARSENIC (UG/L)	93/01/14	.530	<T	.320	<T	.560	<T	.810	<T
		93/01/21	.970	<T	.		1.000	<T	.	
		93/02/10	.730	<T	.630	<T	.440	<T	.800	<T
		93/02/26	.710	<T	.470	<T	.		.370	<T
		93/03/11	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/07	.000	!WP	.110	<T	.280	<T	.150	<T
	BARIUM (UG/L)	93/01/14	27.000		20.000		18.000		19.000	
		93/01/21	37.000		.		26.000		.	
		93/02/10	48.000		30.000		29.000		29.000	
		93/02/26	47.000		30.000		.		31.000	
		93/03/11	52.000		37.000		35.000		36.000	
		93/04/07	.000	!WP	23.000		21.000		1.700	
	BERYLLIUM (UG/L)	93/01/14	.050	<W	.050	<W	.050	<W	.050	<W
		93/01/21	.050	<W	.		.070	<T	.	
		93/02/10	.050	<W	.050	<W	.050	<W	.050	<W
		93/02/26	.090	<T	.100	<T	.		.050	<W
		93/03/11	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/07	.000	!WP	.050	<W	.050	<W	.050	<W
	BORON (UG/L)	93/01/14	25.000		20.000	<T	23.000		24.000	

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :460000348
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
METAL SCAN	BORON (UG/L)	93/01/21	31.000		.		32.000		.	
		93/02/10	40.000		37.000		37.000		37.000	
		93/02/26	70.000		67.000		.		53.000	
		93/03/11	44.000		46.000		79.000		46.000	
		93/04/07	.000	!WP	29.000		21.000		25.000	
	CADMIUM (UG/L)	93/01/14	.050	<W	.050	<W	.050	<W	.220	<T
		93/01/21	.100	<T	.		.130	<T	.	
		93/02/10	.050	<W	.050	<W	.050	<W	.470	<T
		93/02/26	.050	<W	.050	<W	.		.050	<W
		93/03/11	.070	<T	.050	<W	.050	<W	.250	<T
		93/04/07	.000	!WP	.050	<W	.050	<W	.050	<W
	CHROMIUM (UG/L)	93/01/14	3.600	<T	1.400	<T	2.700	<T	3.500	<T
		93/01/21	2.200	<T	.		3.000	<T	.	
		93/02/10	7.300		6.700		5.600		6.000	
		93/02/26	9.900		8.900		.		4.300	<T
		93/03/11	.940	<T	.640	<T	5.300		.640	<T
		93/04/07	.000	!WP	1.200	<T	.720	<T	.540	<T
	COBALT (UG/L)	93/01/14	1.000	<T	.980	<T	1.000	<T	1.200	
		93/01/21	2.600		.		2.600		.	
		93/02/10	.090	<T	.070	<T	.020	<W	.040	<T
		93/02/26	.200	<T	.190	<T	.		.150	<T
		93/03/11	.110	<T	.040	<T	.120	<T	.050	<T
		93/04/07	.000	!WP	.120	<T	.150	<T	.090	<T
	COPPER (UG/L)	93/01/14	2.800	<T	1.600	<T	1.600	<T	1.400	<T
		93/01/21	4.000	<T	.		2.200	<T	.	
		93/02/10	7.100		5.000	<T	2.000	<T	2.600	<T
		93/02/26	2.600	<T	3.800	<T	.		2.200	<T
		93/03/11	3.700	<T	3.900	<T	2.300	<T	32.000	
		93/04/07	.000	!WP	3.250	<T	1.300	<T	1.000	<T
	IRON (UG/L)	93/01/14	230.000		60.000	<T	64.000		20.000	<T
		93/01/21	190.000		.		19.000	<T	.	
		93/02/10	120.000		11.000	<T	16.000	<T	11.000	<T
		93/02/26	120.000		7.300	<T	.		19.000	<T
		93/03/11	160.000		8.600	<T	8.100	<T	6.000	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :920000696
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H202	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
METAL SCAN	IRON (UG/L)	93/04/07	.000	!WP	6.000	<W	6.300	<T	6.000	<W
	LEAD (UG/L)	93/01/14	.360	<T	.050	<W	.110	<T	.050	<W
		93/01/21	.500	<T	.		.170	<T	.	
		93/02/10	.700		.490	<T	.080	<T	.080	<T
		93/02/26	.300	<T	.300	<T	.		.060	<T
		93/03/11	.710		.350	<T	.110	<T	.190	<T
		93/04/07	.000	!WP	.260	<T	.070	<T	.060	<T
	MANGANESE (UG/L)	93/01/14	22.000		19.000		17.000		18.000	
		93/01/21	38.000		.		33.000		.	
		93/02/10	37.000		39.000		39.000		38.000	
		93/02/26	34.000		34.000		.		36.000	
		93/03/11	49.000		47.000		43.000		11.000	
		93/04/07	.000	!WP	25.000		24.000		.190	<T
	MERCURY (UG/L)	93/01/14	.020	<W	.020	<W	.020	<W	.020	<W
		93/01/21	.020	<W	.		.020	<W	.	
		93/02/10	.020	<W	.020	<W	.020	<W	.020	<W
		93/02/26	.020	<W	.020	<W	.		.020	<W
		93/03/11	.020	<W	.020	<W	.020	<W	.020	<W
		93/04/07	.020	<W	.020	<W	.020	<W	.020	<W
	MOLYBDENUM (UG/L)	93/01/14	.290	<T	.390	<T	.420	<T	.720	
		93/01/21	.590		.		.810		.	
		93/02/10	1.100		1.300		1.300		1.600	
		93/02/26	1.800		1.700		.		1.600	
		93/03/11	1.300		1.500		1.300		1.400	
		93/04/07	.000	!WP	.580		.520		.150	<T
	NICKEL (UG/L)	93/01/14	2.400		1.700	<T	1.700	<T	1.600	<T
		93/01/21	7.700		.		6.100		.	
		93/02/10	.200	<W	.200	<W	.200	<W	.200	<W
		93/02/26	.810	<T	1.100	<T	.		1.500	<T
		93/03/11	.200	<W	.200	<W	.200	<W	.200	<W
		93/04/07	.000	!WP	.200	<W	.200	<W	.200	<W
	SELENIUM (UG/L)	93/01/14	1.400	<T	2.100	<T	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.400	<T	1.000	<W	1.100	<T

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS ;690000522
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
METAL SCAN	SELENIUM (UG/L)	93/02/26	1.100	<T	1.200	<T	.		1.200	<T
		93/03/11	1.300	<T	1.000	<W	1.200	<T	1.600	<T
		93/04/07	.000	!WP	1.000	<W	1.000	<W	1.000	<W
	SILVER (UG/L)	93/01/14	.050	<W	.050	<W	.050	<W	.050	<W
		93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.050	<W	.050	<W	.050	<W	.050	<W
		93/02/26	.050	<W	.050	<W	.		.050	<W
		93/03/11	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/07	.000	!WP	.050	<W	.050	<W	.190	<T
	STRONTIUM (UG/L)	93/01/14	260.000		250.000		230.000		260.000	
		93/01/21	450.000		.		430.000		.	
		93/02/10	580.000		560.000		550.000		550.000	
		93/02/26	710.000		680.000		.		670.000	
		93/03/11	740.000		720.000		620.000		720.000	
		93/04/07	.000	!WP	300.000		290.000		290.000	
	THALLIUM (UG/L)	93/01/14	.050	<W	.050	<W	.050	<W	.050	<W
		93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.050	<W	.050	<W	.050	<W	.050	<W
		93/02/26	.050	<W	.050	<W	.		.050	<W
		93/03/11	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/07	.000	!WP	.050	<W	.050	<W	.050	<W
	TITANIUM (UG/L)	93/01/14	20.000		13.000		14.000		16.000	
		93/01/21	29.000		.		22.000		.	
		93/02/10	4.400	<T	2.900	<T	2.900	<T	3.200	<T
		93/02/26	7.500		4.500	<T	.		4.100	<T
		93/03/11	9.500		5.300		5.600		5.700	
		93/04/07	.000	!WP	5.200		4.800	<T	6.900	
	URANIUM (UG/L)	93/01/14	.640		.240	<T	.210	<T	.160	<T
		93/01/21	.600		.		.150	<T	.	
		93/02/10	1.000		.090	<T	.090	<T	.090	<T
		93/02/26	.820		.090	<T	.		.130	<T
		93/03/11	1.100		.130	<T	.080	<T	.090	<T
		93/04/07	.000	!WP	.050	<W	.050	<W	.050	<W
	VANADIUM (UG/L)	93/01/14	.640		.320	<T	.380	<T	.380	<T

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :460000348
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
METAL SCAN	VANADIUM (UG/L)	93/01/21	.710		.		.450	<T	.	
		93/02/10	.450	<T	.240	<T	.240	<T	.260	<T
		93/02/26	.420	<T	.240	<T	.		.280	<T
		93/03/11	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/07	.000	!WP	.050	<W	.050	<W	.050	<W
	ZINC (UG/L)	93/01/14	8.500		4.900		4.300		4.400	
		93/01/21	9.500		.		7.300		.	
		93/02/10	12.000		8.700		5.500		5.600	
		93/02/26	10.000		7.400		.		5.800	
		93/03/11	13.000		8.900		5.000		7.500	
		93/04/07	.000	!WP	4.000		2.600		1.200	<T
PCB/OC SCAN, PESTCOS	ALACHLOR (LASSO) (NG/L)	93/01/14	500.000	<W	500.000	<W	500.000	<W	500.000	<W
		93/01/21	500.000	<W	.		500.000	<W	.	
		93/02/10	500.000	<W	500.000	<W	500.000	<W	500.000	<W
		93/02/26	500.000	<W	500.000	<W	.		500.000	<W
		93/03/11	500.000	<W	500.000	<W	500.000	<W	500.000	<W
		93/04/07	500.000	<W	500.000	<W	500.000	<W	500.000	<W
	ALDRIN (NG/L)	93/01/14	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/02/26	1.000	<W	1.000	<W	.		1.000	<W
		93/03/11	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
	ALPHA BHC (NG/L)	93/01/14	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/02/26	2.000	<T	2.000	<T	.		2.000	<T
		93/03/11	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
	ALPHA CHLORDANE (NG/L)	93/01/14	2.000	<W	2.000	<W	2.000	<W	2.000	<W
		93/01/21	2.000	<W	.		2.000	<W	.	
		93/02/10	2.000	<W	2.000	<W	2.000	<W	2.000	<W
		93/02/26	2.000	<W	2.000	<W	.		2.000	<W
		93/03/11	2.000	<W	2.000	<W	2.000	<W	2.000	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :920000696
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
PCB/OC SCAN, PESTCDS	ALPHA CHLORDANE (NG/L)	93/04/07	2.000	<W	2.000	<W	2.000	<W	2.000	<W
	AMETRINE (NG/L)	93/01/14	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/01/21	50.000	<W	.		50.000	<W	.	
		93/02/10	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/02/26	50.000	<W	50.000	<W	.		50.000	<W
		93/03/11	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/04/07	50.000	<W	50.000	<W	50.000	<W	50.000	<W
	ATRATONE (NG/L)	93/01/14	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/01/21	50.000	<W	.		50.000	<W	.	
		93/02/10	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/02/26	50.000	<W	50.000	<W	.		50.000	<W
		93/03/11	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/04/07	50.000	<W	50.000	<W	50.000	<W	50.000	<W
	ATRAZINE (NG/L)	93/01/14	100.000	<T	90.000	<T	50.000	<W	50.000	<W
		93/01/21	80.000	<T	.		50.000	<W	.	
		93/02/10	60.000	<T	60.000	<T	50.000	<W	60.000	<T
		93/02/26	50.000	<W	50.000	<W	.		50.000	<W
		93/03/11	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/04/07	110.000	<T	110.000	<T	50.000	<W	80.000	<T
	BETA BHC (NG/L)	93/01/14	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/02/26	1.000	<W	1.000	<W	.		1.000	<W
		93/03/11	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
	CYANAZINE (BLADEX) (NG/L)	93/01/14	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/01/21	100.000	<W	.		100.000	<W	.	
		93/02/10	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/02/26	100.000	<W	100.000	<W	.		100.000	<W
		93/03/11	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/04/07	100.000	<W	100.000	<W	100.000	<W	100.000	<W
	DESETHYL ATRAZINE (NG/L)	93/01/14	200.000	<W	200.000	<W	200.000	<W	200.000	<W
		93/01/21	200.000	<W	.		200.000	<W	.	
		93/02/10	200.000	<W	200.000	<W	200.000	<W	200.000	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :690000522
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
PCB/OC SCAN, PESTCDS	DESETHYL ATRAZINE (NG/L)	93/02/26	200.000	<W	200.000	<W	.		200.000	<W
		93/03/11	200.000	<W	200.000	<W	200.000	<W	200.000	<W
		93/04/07	200.000	<W	200.000	<W	200.000	<W	200.000	<W
	DESETHYL SIMAZINE (NG/L)	93/01/14	200.000	<W	200.000	<W	200.000	<W	200.000	<W
		93/01/21	200.000	<W	.		200.000	<W	.	
		93/02/10	200.000	<W	200.000	<W	200.000	<W	200.000	<W
		93/02/26	200.000	<W	200.000	<W	.		200.000	<W
		93/03/11	200.000	<W	200.000	<W	200.000	<W	200.000	<W
		93/04/07	200.000	<W	200.000	<W	200.000	<W	200.000	<W
	DIELDRIN (NG/L)	93/01/14	2.000	<W	2.000	<W	2.000	<W	2.000	<W
		93/01/21	2.000	<W	.		2.000	<W	.	
		93/02/10	2.000	<W	2.000	<W	2.000	<W	2.000	<W
		93/02/26	2.000	<W	2.000	<W	.		2.000	<W
		93/03/11	2.000	<W	2.000	<W	2.000	<W	2.000	<W
		93/04/07	2.000	<W	2.000	<W	2.000	<W	2.000	<W
	ENDOSULFAN I (NG/L)	93/01/14	2.000	<W	2.000	<W	2.000	<W	2.000	<W
		93/01/21	2.000	<W	.		2.000	<W	.	
		93/02/10	2.000	<W	2.000	<W	2.000	<W	2.000	<W
		93/02/26	2.000	<W	2.000	<W	.		2.000	<W
		93/03/11	2.000	<W	2.000	<W	2.000	<W	2.000	<W
		93/04/07	2.000	<W	2.000	<W	2.000	<W	2.000	<W
	ENDOSULFAN II (NG/L)	93/01/14	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/01/21	5.000	<W	.		5.000	<W	.	
		93/02/10	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/02/26	5.000	<W	5.000	<W	.		5.000	<W
		93/03/11	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/04/07	5.000	<W	5.000	<W	5.000	<W	5.000	<W
	ENDOSULFAN SULPHATE (NG/L)	93/01/14	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/01/21	5.000	<W	.		5.000	<W	.	
		93/02/10	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/02/26	5.000	<W	5.000	<W	.		5.000	<W
		93/03/11	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/04/07	5.000	<W	5.000	<W	5.000	<W	5.000	<W
	ENDRIN (NG/L)	93/01/14	5.000	<W	5.000	<W	5.000	<W	5.000	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :460000348
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
PCB/OC SCAN, PESTCDS	ENDRIN (NG/L)	93/01/21	5.000	<W	.		5.000	<W	.	
		93/02/10	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/02/26	5.000	<W	5.000	<W	.		5.000	<W
		93/03/11	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/04/07	5.000	<W	5.000	<W	5.000	<W	5.000	<W
	GAMMA CHLORDANE (NG/L)	93/01/14	2.000	<W	2.000	<W	2.000	<W	2.000	<W
		93/01/21	2.000	<W	.		2.000	<W	.	
		93/02/10	2.000	<W	2.000	<W	2.000	<W	2.000	<W
		93/02/26	2.000	<W	2.000	<W	.		2.000	<W
		93/03/11	2.000	<W	2.000	<W	2.000	<W	2.000	<W
		93/04/07	2.000	<W	2.000	<W	2.000	<W	2.000	<W
	HEPTACHLOR (NG/L)	93/01/14	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/02/26	1.000	<W	1.000	<W	.		1.000	<W
		93/03/11	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
	HEPTACHLOR EPOXIDE (NG/L)	93/01/14	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/02/26	1.000	<W	1.000	<W	.		1.000	<W
		93/03/11	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
	HEXACLCYCLOPENTADIEN (NG/L)	93/01/14	.000	!QU	.000	!QU	.000	!QU	.000	!QU
		93/01/21	.000	!QU	.		.000	!QU	.	
		93/02/10	.000	!QU	.000	!QU	.000	!QU	.000	!QU
		93/02/26	.000	!NP	.000	!NP	.		.000	!NP
		93/03/11	.000	!NP	.000	!NP	.000	!NP	.000	!NP
		93/04/07	.000	!NP	.000	!NP	.000	!NP	.000	!NP
	LINDANE (GAMMA BHC) (NG/L)	93/01/14	1.000	<W	1.000	<T	1.000	<T	1.000	<W
		93/01/21	3.000	<T	.		1.000	<T	.	
		93/02/10	1.000	<T	1.000	<T	1.000	<T	1.000	<T
		93/02/26	1.000	<W	1.000	<W	.		1.000	<W
		93/03/11	2.000	<T	3.000	<T	2.000	<T	1.000	<T

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :920000696
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
PCB/OC SCAN, PESTCDS	LINDANE (GAMMA BHC) (NG/L)	93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
	METHOXYCHLOR (NG/L)	93/01/14	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/01/21	5.000	<W	.		5.000	<W	.	
		93/02/10	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/02/26	5.000	<W	5.000	<W	.		5.000	<W
		93/03/11	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/04/07	5.000	<W	5.000	<W	5.000	<W	5.000	<W
	METOLACHLOR (NG/L)	93/01/14	500.000	<W	500.000	<W	500.000	<W	500.000	<W
		93/01/21	500.000	<W	.		500.000	<W	.	
		93/02/10	500.000	<W	500.000	<W	500.000	<W	500.000	<W
		93/02/26	500.000	<W	500.000	<W	.		500.000	<W
		93/03/11	500.000	<W	500.000	<W	500.000	<W	500.000	<W
		93/04/07	500.000	<W	500.000	<W	500.000	<W	500.000	<W
	METRIBUZIN (SENCOR) (NG/L)	93/01/14	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/01/21	100.000	<W	.		100.000	<W	.	
		93/02/10	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/02/26	100.000	<W	100.000	<W	.		100.000	<W
		93/03/11	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/04/07	100.000	<W	100.000	<W	100.000	<W	100.000	<W
	MIREX (NG/L)	93/01/14	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/01/21	5.000	<W	.		5.000	<W	.	
		93/02/10	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/02/26	5.000	<W	5.000	<W	.		5.000	<W
		93/03/11	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/04/07	5.000	<W	5.000	<W	5.000	<W	5.000	<W
	O,P-DDT (NG/L)	93/01/14	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/01/21	5.000	<W	.		5.000	<W	.	
		93/02/10	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/02/26	5.000	<W	5.000	<W	.		5.000	<W
		93/03/11	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/04/07	5.000	<W	5.000	<W	5.000	<W	5.000	<W
	OXYCHLORDANE (NG/L)	93/01/14	2.000	<W	2.000	<W	2.000	<W	2.000	<W
		93/01/21	2.000	<W	.		2.000	<W	.	
		93/02/10	2.000	<W	2.000	<W	2.000	<W	2.000	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :690000522
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
PCB/OC SCAN, PESTCOS	OXYCHLORDANE (NG/L)	93/02/26	2.000	<W	2.000	<W	.		2.000	<W
		93/03/11	2.000	<W	2.000	<W	2.000	<W	2.000	<W
		93/04/07	2.000	<W	2.000	<W	2.000	<W	2.000	<W
	P,P-DDD (NG/L)	93/01/14	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/01/21	5.000	<W	.		5.000	<W	.	
		93/02/10	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/02/26	5.000	<W	5.000	<W	.		5.000	<W
		93/03/11	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/04/07	5.000	<W	5.000	<W	5.000	<W	5.000	<W
	P,P-DDE (NG/L)	93/01/14	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/01/21	1.000	<W	.		1.000	<W	.	
		93/02/10	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/02/26	1.000	<W	1.000	<W	.		1.000	<W
		93/03/11	1.000	<W	1.000	<W	1.000	<W	1.000	<W
		93/04/07	1.000	<W	1.000	<W	1.000	<W	1.000	<W
	P,P-DDT (NG/L)	93/01/14	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/01/21	5.000	<W	.		5.000	<W	.	
		93/02/10	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/02/26	5.000	<W	5.000	<W	.		5.000	<W
		93/03/11	5.000	<W	5.000	<W	5.000	<W	5.000	<W
		93/04/07	5.000	<W	5.000	<W	5.000	<W	5.000	<W
	PCB (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/02/26	20.000	<W	20.000	<W	.		20.000	<W
		93/03/11	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W
	PROMETONE (NG/L)	93/01/14	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/01/21	50.000	<W	.		50.000	<W	.	
		93/02/10	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/02/26	50.000	<W	50.000	<W	.		50.000	<W
		93/03/11	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/04/07	50.000	<W	50.000	<W	50.000	<W	50.000	<W
	PROMETRYNE (NG/L)	93/01/14	50.000	<W	50.000	<W	50.000	<W	50.000	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :460000348
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
PCB/OC SCAN, PESTCDS	PROMETRYNE (NG/L)	93/01/21	50.000	<W	.		50.000	<W	.	
		93/02/10	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/02/26	50.000	<W	50.000	<W	.		50.000	<W
		93/03/11	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/04/07	50.000	<W	50.000	<W	50.000	<W	50.000	<W
	PROPAZINE (NG/L)	93/01/14	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/01/21	50.000	<W	.		50.000	<W	.	
		93/02/10	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/02/26	50.000	<W	50.000	<W	.		50.000	<W
		93/03/11	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/04/07	50.000	<W	50.000	<W	50.000	<W	50.000	<W
	SIMAZINE (NG/L)	93/01/14	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/01/21	50.000	<W	.		50.000	<W	.	
		93/02/10	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/02/26	50.000	<W	50.000	<W	.		50.000	<W
		93/03/11	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/04/07	50.000	<W	50.000	<W	50.000	<W	50.000	<W
	TOXAPHENE (NG/L)	93/01/14	500.000	<W	500.000	<W	500.000	<W	500.000	<W
		93/01/21	500.000	<W	.		500.000	<W	.	
		93/02/10	500.000	<W	500.000	<W	500.000	<W	500.000	<W
		93/02/26	500.000	<W	500.000	<W	.		500.000	<W
		93/03/11	500.000	<W	500.000	<W	500.000	<W	500.000	<W
PHENOLICS	PHENOLICS (UG/L)	93/04/07	500.000	<W	500.000	<W	500.000	<W	500.000	<W
		93/01/14	.600	<T	.200	<W	.200	<W	.200	<W
		93/01/21	.200	<W	.		.200	<W	.	
		93/02/10	.600	<T	.600	<T	.200	<W	.600	<T
		93/02/26	1.000	<T	.400	<T	.		1.000	<T
		93/03/11	.200	<W	.400	<T	.200	<W	.200	<W
		93/04/07	.200	<W	.200	<W	.200	<W	.600	<T
SPECIFIC PESTICIDES	2,4 D PROPIONIC ACID (NG/L)	93/01/14	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/01/21	100.000	<W	.		100.000	<W	.	
		93/02/10	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/02/26	100.000	<W	100.000	<W	.		100.000	<W
		93/03/11	100.000	<W	100.000	<W	100.000	<W	100.000	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :920000696
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
SPECIFIC PESTICIDES	2,4 D PROPIONIC ACID (NG/L)	93/04/07	100.000	<W	100.000	<W	100.000	<W	100.000	<W
	2,4,5-T (NG/L)	93/01/14	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/01/21	50.000	<W	.		50.000	<W	.	
		93/02/10	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/02/26	50.000	<W	50.000	<W	.		50.000	<W
		93/03/11	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/04/07	50.000	<W	50.000	<W	50.000	<W	50.000	<W
	2,4,5-TP (SILVEX) (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/02/26	20.000	<W	20.000	<W	.		20.000	<W
		93/03/11	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W
	2,4-D (NG/L)	93/01/14	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/01/21	100.000	<W	.		100.000	<W	.	
		93/02/10	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/02/26	100.000	<W	100.000	<W	.		100.000	<W
		93/03/11	100.000	<W	100.000	<W	100.000	<W	100.000	<W
		93/04/07	100.000	<W	100.000	<W	100.000	<W	100.000	<W
	2,4-DB (NG/L)	93/01/14	200.000	<W	200.000	<W	200.000	<W	200.000	<W
		93/01/21	200.000	<W	.		200.000	<W	.	
		93/02/10	200.000	<W	200.000	<W	200.000	<W	200.000	<W
		93/02/26	200.000	<W	200.000	<W	.		200.000	<W
		93/03/11	200.000	<W	200.000	<W	200.000	<W	200.000	<W
		93/04/07	200.000	<W	200.000	<W	200.000	<W	200.000	<W
	AMINOCARB (NG/L)	93/01/14	.000	!NP	.000	!NP	.000	!NP	.000	!NP
		93/01/21	.000	!NP	.		.000	!NP	.	
		93/02/10	.000	!NP	.000	!NP	.000	!NP	.000	!NP
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	.000	!NP	.000	!NP	.000	!NP	.000	!NP
	AZINPHOS-METHYL (NG/L)	93/01/14	.000	!NP	.000	!NP	.000	!NP	.000	!NP
		93/01/21	.000	!NP	.		.000	!NP	.	
		93/02/10	.000	!NP	.000	!NP	.000	!NP	.000	!NP
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :920000696
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H202	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
SPECIFIC PESTICIDES	AZINPHOS-METHYL (NG/L)	93/04/07	.000	!NP	.000	!NP	.000	!NP	.000	!NP
	BENONYL (NG/L)	93/01/14	.000	!NP	.000	!NP	.000	!NP	.000	!NP
		93/01/21	.000	!NP	.		.000	!NP	.	
		93/02/10	.000	!NP	.000	!NP	.000	!NP	.000	!NP
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	.000	!NP	.000	!NP	.000	!NP	.000	!NP
	BUTYLATE (NG/L)	93/01/14	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
		93/01/21	2000.000	<W	.		2000.000	<W	.	
		93/02/10	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
	BUX (NG/L)	93/01/14	.000	!NP	.000	!NP	.000	!NP	.000	!NP
		93/01/21	.000	!NP	.		.000	!NP	.	
		93/02/10	.000	!NP	.000	!NP	.000	!NP	.000	!NP
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	.000	!NP	.000	!NP	.000	!NP	.000	!NP
	CARBARYL (NG/L)	93/01/14	200.000	<W	200.000	<W	200.000	<W	200.000	<W
		93/01/21	200.000	<W	.		200.000	<W	.	
		93/02/10	200.000	<W	200.000	<W	200.000	<W	200.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	200.000	<W	200.000	<W	200.000	<W	200.000	<W
	CARBOFURAN (NG/L)	93/01/14	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
		93/01/21	2000.000	<W	.		2000.000	<W	.	
		93/02/10	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
	CHLORPROPHAM (CIPC) (NG/L)	93/01/14	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
		93/01/21	2000.000	<W	.		2000.000	<W	.	
		93/02/10	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
	CHLORPYRIFOS (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	20.000	<W	20.000	<W	20.000	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :690000522
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H202	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
SPECIFIC PESTICIDES	CHLORPYRIFOS (NG/L)	93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W
	DIALLATE (NG/L)	93/01/14	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
		93/01/21	2000.000	<W	.		2000.000	<W	.	
		93/02/10	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
	DIAZINON (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W
	DICAMBA (NG/L)	93/01/14	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/01/21	50.000	<W	.		50.000	<W	.	
		93/02/10	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/02/26	50.000	<W	50.000	<W	.		50.000	<W
		93/03/11	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/04/07	50.000	<W	50.000	<W	50.000	<W	50.000	<W
	DICHLOROVOS (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W
	EPTAM (NG/L)	93/01/14	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
		93/01/21	2000.000	<W	.		2000.000	<W	.	
		93/02/10	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
	ETHION (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W
	IPC (NG/L)	93/01/14	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :460000348
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
SPECIFIC PESTICIDES	IPC (NG/L)	93/01/21	2000.000	<W	.		2000.000	<W	.	
		93/02/10	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
	MALATHION (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W
	METHYL PARATHION (NG/L)	93/01/14	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/01/21	50.000	<W	.		50.000	<W	.	
		93/02/10	50.000	<W	50.000	<W	50.000	<W	50.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	50.000	<W	50.000	<W	50.000	<W	50.000	<W
	METHYLTRITHION (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W
	MEVINPHOS (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W
	PARATHION (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W
	PHORATE (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :920000696
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H202	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
SPECIFIC PESTICIDES	PICHLORAM (NG/L)	93/01/14	.000	!NP	.000	!NP	.000	!NP	.000	!NP
		93/01/21	.000	!NP	.		.000	!NP	.	
		93/02/10	.000	!NP	.000	!NP	.000	!NP	.000	!NP
		93/02/26	.000	!NP	.000	!NP	.		.000	!NP
		93/03/11	.000	!NP	.000	!NP	.000	!NP	.000	!NP
		93/04/07	.000	!NP	.000	!NP	.000	!NP	.000	!NP
	PROPOXUR (NG/L)	93/01/14	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
		93/01/21	2000.000	<W	.		2000.000	<W	.	
		93/02/10	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	2000.000	<W	2000.000	<W	2000.000	<W	2000.000	<W
	RELDAN (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W
	RONNEL (NG/L)	93/01/14	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/01/21	20.000	<W	.		20.000	<W	.	
		93/02/10	20.000	<W	20.000	<W	20.000	<W	20.000	<W
		93/02/26	.000	!IS	.000	!IS	.		.000	!IS
		93/04/07	20.000	<W	20.000	<W	20.000	<W	20.000	<W
VOLATILES	1,1-DICHLOROETHANE (UG/L)	93/01/14	.100	<W	.100	<W	.100	<W	.100	<W
		93/01/21	.100	<W	.		.100	<W	.	
		93/02/10	.100	<W	.100	<W	.100	<W	.100	<W
		93/02/26	.100	<W	.100	<W	.		.100	<W
		93/03/11	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/07	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/20	.100	<W	.100	<W	.100	<W	.100	<W
	1,1-DICHLOROETHYLENE (UG/L)	93/01/14	.100	<W	.100	<W	.100	<W	.100	<W
		93/01/21	.100	<W	.		.100	<W	.	
		93/02/10	.100	<W	.100	<W	.100	<W	.100	<W
		93/02/26	.100	<W	.100	<W	.		.100	<W
		93/03/11	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/07	.100	<W	.100	<W	.100	<W	.100	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :920000696
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
VOLATILES	1,1-DICHLOROETHYLENE (UG/L)	93/04/20	.100	<W	.100	<W	.100	<W	.100	<W
	1,2 DICHLOROETHANE (UG/L)	93/01/14	.050	<W	.050	<W	.050	<W	.050	<W
		93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.050	<W	.050	<W	.050	<W	.050	<W
		93/02/26	.050	<W	.050	<W	.		.050	<W
		93/03/11	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/07	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/20	.050	<W	.050	<W	.050	<W	.050	<W
	1,2-DICHLOROBENZENE (UG/L)	93/01/14	.050	<W	.050	<W	.050	<W	.050	<W
		93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.050	<W	.050	<W	.050	<W	.050	<W
		93/02/26	.050	<W	.050	<W	.		.050	<W
		93/03/11	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/07	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/20	.050	<W	.050	<W	.050	<W	.050	<W
	1,2-DICHLOROPROPANE (UG/L)	93/01/14	.050	<W	.050	<W	.050	<W	.050	<W
		93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.050	<W	.050	<W	.050	<W	.050	<W
		93/02/26	.050	<W	.050	<W	.		.050	<W
		93/03/11	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/07	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/20	.050	<W	.050	<W	.050	<W	.050	<W
	1,3-DICHLOROBENZENE (UG/L)	93/01/14	.100	<W	.100	<W	.100	<W	.100	<W
		93/01/21	.100	<W	.		.100	<W	.	
		93/02/10	.100	<W	.100	<W	.100	<W	.100	<W
		93/02/26	.100	<W	.100	<W	.		.100	<W
		93/03/11	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/07	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/20	.100	<W	.100	<W	.100	<W	.100	<W
	1,4-DICHLOROBENZENE (UG/L)	93/01/14	.100	<W	.100	<W	.100	<W	.100	<W
		93/01/21	.100	<W	.		.100	<W	.	
		93/02/10	.100	<W	.100	<W	.100	<W	.100	<W
		93/02/26	.100	<W	.100	<W	.		.100	<W
		93/03/11	.100	<W	.100	<W	.100	<W	.100	<W

ORINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :920000696
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H202	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
VOLATILES	1,4-OICHLOROBENZENE (UG/L)	93/04/07	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/20	.100	<W	.100	<W	.100	<W	.100	<W
	111,TRICHLOROETHANE (UG/L)	93/01/14	.020	<W	.020	<W	.020	<W	.020	<W
		93/01/21	.020	<W	.		.020	<W	.	
		93/02/10	.040	<T	.060	<T	.060	<T	.060	<T
		93/02/26	.020	<W	.020	<W	.		.020	<W
		93/03/11	.020	<W	.020	<W	.020	<W	.020	<W
		93/04/07	.020	<W	.020	<W	.020	<W	.020	<W
		93/04/20	.020	<W	.020	<W	.020	<W	.020	<W
	112-TRICHLOROETHANE (UG/L)	93/01/14	.050	<W	.050	<W	.050	<W	.050	<W
		93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.050	<W	.050	<W	.050	<W	.050	<W
		93/02/26	.050	<W	.050	<W	.		.050	<W
		93/03/11	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/07	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/20	.050	<W	.050	<W	.050	<W	.050	<W
	1122-TETCHLOROETHANE (UG/L)	93/01/14	.050	<W	.050	<W	.050	<W	.050	<W
		93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.050	<W	.050	<W	.050	<W	.050	<W
		93/02/26	.050	<W	.050	<W	.		.050	<W
		93/03/11	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/07	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/20	.050	<W	.050	<W	.050	<W	.050	<W
	BENZENE (UG/L)	93/01/14	.050	<W	.050	<W	.050	<W	.050	<W
		93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.050	<W	.050	<W	.050	<W	.050	<W
		93/02/26	.050	<W	.050	<W	.		.050	<W
		93/03/11	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/07	.050	<W	.050	<T	.050	<W	.050	<W
		93/04/20	.050	<W	.050	<W	.050	<W	.050	<W
	BROMOFORM (UG/L)	93/01/14	.200	<W	.200	<W	.200	<W	.200	<W
		93/01/21	.200	<W	.		.200	<W	.	
		93/02/10	.200	<W	.200	<W	.200	<W	.200	<W
		93/02/26	.200	<W	.200	<W	.		.200	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :920000696
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
VOLATILES	BROMOFORM (UG/L)	93/03/11	.200	<W	.200	<W	.200	<W	.200	<W
		93/04/07	.200	<W	.200	<W	.200	<W	.200	<W
		93/04/20	.200	<W	.200	<W	.200	<W	.200	<W
	C12-DICHLOROETHYLENE (UG/L)	93/01/14	.100	<W	.100	<W	.100	<W	.100	<W
		93/01/21	.100	<W	.		.100	<W	.	
		93/02/10	.100	<W	.100	<W	.100	<W	.100	<W
		93/02/26	.100	<W	.100	<W	.		.100	<W
		93/03/11	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/07	.100	<W	.100	<W	.100	<W	.100	<T
		93/04/20	.100	<W	.100	<W	.100	<W	.100	<W
	CARBON TETRACHLORIDE (UG/L)	93/01/14	.200	<W	.200	<W	.200	<W	.200	<W
		93/01/21	.200	<W	.		.200	<W	.	
		93/02/10	.200	<W	.200	<W	.200	<W	.200	<W
		93/02/26	.200	<W	.200	<W	.		.200	<W
		93/03/11	.200	<W	.200	<W	.200	<W	.200	<W
		93/04/07	.200	<W	.200	<W	.200	<W	.200	<W
		93/04/20	.200	<W	.200	<W	.200	<W	.200	<W
	CHLOROBENZENE (UG/L)	93/01/14	.100	<W	.100	<W	.100	<W	.100	<W
		93/01/21	.100	<W	.		.100	<W	.	
		93/02/10	.100	<W	.100	<W	.100	<W	.100	<W
		93/02/26	.100	<W	.100	<W	.		.100	<W
		93/03/11	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/07	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/20	.100	<W	.100	<W	.100	<W	.100	<W
	CHLORODIBROMOMETHANE (UG/L)	93/01/14	.100	<W	.100	<W	.100	<W	.100	<W
		93/01/21	.100	<W	.		.100	<W	.	
		93/02/10	.100	<W	.100	<W	.100	<W	.100	<W
		93/02/26	.100	<W	.100	<W	.		.100	<W
		93/03/11	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/07	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/20	.100	<W	.100	<W	.100	<W	1.200	
	CHLOROFORM (UG/L)	93/01/14	.100	<W	6.400		2.000		.700	<T
		93/01/21	.100	<W	.		.100	<T	.	
		93/02/10	.100	<T	1.700		.900	<T	.800	<T

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :690000522
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
VOLATILES	CHLOROFORM (UG/L)	93/02/26	.200	<T	.800	<T	.		.900	<T
		93/03/11	.100	<T	1.900		1.000	<T	1.500	
		93/04/07	.100	<W	.100	<T	1.000	<T	1.600	
		93/04/20	.100	<W	.400	<T	9.200		12.100	
	DICHLOROBROMOMETHANE (UG/L)	93/01/14	.050	<W	1.650		.250	<T	.050	<W
		93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.050	<W	.900		.400	<T	.400	<T
		93/02/26	.050	<W	.300	<T	.		.350	<T
		93/03/11	.050	<W	.800		.400	<T	.550	
		93/04/07	.050	<W	.050	<W	.200	<T	.350	<T
		93/04/20	.050	<W	.150	<T	3.000		5.350	
	ETHLYENE DIBROMIDE (UG/L)	93/01/14	.050	<W	.050	<W	.050	<W	.050	<W
		93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.050	<W	.050	<W	.050	<W	.050	<W
		93/02/26	.050	<W	.050	<W	.		.050	<W
		93/03/11	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/07	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/20	.050	<W	.050	<W	.050	<W	.050	<W
	ETHYLBENZENE (UG/L)	93/01/14	.050	<W	.050	<W	.600		.050	<T
		93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.050	<T	.050	<T	.050	<W	.050	<W
		93/02/26	.050	<W	.050	<W	.		.050	<W
		93/03/11	.050	<W	.050	<W	.050	<W	.100	<T
		93/04/07	.050	<W	.050	<W	.100	<T	.100	<T
		93/04/20	.050	<W	.050	<T	.050	<W	.100	<T
	M-XYLENE (UG/L)	93/01/14	.100	<W	.100	<W	.100	<W	.100	<W
		93/01/21	.100	<W	.		.100	<W	.	
		93/02/10	.100	<W	.100	<W	.100	<W	.100	<W
		93/02/26	.100	<W	.100	<W	.		.100	<W
		93/03/11	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/07	.100	<W	.100	<W	.100	<W	.100	<T
		93/04/20	.100	<W	.100	<W	.100	<W	.100	<W
	METHYLENE CHLORIDE (UG/L)	93/01/14	.500	<W	1.000	<T	1.000	<T	.500	<W
		93/01/21	.500	<W	.		.500	<W	.	

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :920000696
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H2O2	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
VOLATILES	METHYLENE CHLORIDE (UG/L)	93/02/10	.500	<W	.500	<W	1.000	<T	.500	<W
		93/02/26	.500	<W	.500	<W	.		.500	<W
		93/03/11	.500	<W	.500	<W	.500	<W	.500	<W
		93/04/07	.500	<W	.500	<W	.500	<W	.500	<W
		93/04/20	.500	<W	.500	<W	.500	<W	.500	<W
	O-XYLENE (UG/L)	93/01/14	.050	<W	.050	<W	.050	<W	.050	<W
		93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.050	<W	.050	<W	.050	<W	.050	<W
		93/02/26	.050	<W	.050	<W	.		.050	<W
		93/03/11	.050	<W	.050	<T	.050	<W	.050	<W
		93/04/07	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/20	.050	<W	.050	<W	.050	<W	.050	<W
	P-XYLENE (UG/L)	93/01/14	.100	<W	.100	<W	.100	<W	.100	<W
		93/01/21	.100	<W	.		.100	<W	.	
		93/02/10	.100	<W	.100	<W	.100	<W	.100	<W
		93/02/26	.100	<W	.100	<W	.		.100	<W
		93/03/11	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/07	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/20	.100	<W	.100	<W	.100	<W	.100	<W
	STYRENE (UG/L)	93/01/14	.050	<W	.050	<W	1.300		.150	<T
		93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.100	<T	.050	<T	.050	<T	.050	<T
		93/02/26	.050	<T	.050	<W	.		.050	<T
		93/03/11	.050	<T	.050	<W	.100	<T	.150	<T
		93/04/07	.050	<T	.050	<W	.250	<T	.200	<T
		93/04/20	.050	<W	.100	<T	.100	<T	.100	<T
	T12-DICHLOROETHYLENE (UG/L)	93/01/14	.100	<W	.100	<W	.100	<W	.100	<W
		93/01/21	.100	<W	.		.100	<W	.	
		93/02/10	.100	<W	.100	<W	.100	<W	.100	<W
		93/02/26	.100	<W	.100	<W	.		.100	<W
		93/03/11	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/07	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/20	.100	<W	.100	<W	.100	<W	.100	<W
	TETRACHLOROETHYLENE (UG/L)	93/01/14	.050	<W	.050	<W	.050	<W	.050	<W

DRINKING WATER SURVEILLANCE PROGRAM
PLANT :OHSWEKEN WTP
WORKS :460000348
RESULT BY SAMPLE DATE AND PARAMETER
YEAR 1993

		LOC_NAME	RAW TAP		TREATED TAP		POST LAMP 3		POST LAMP 3 + H202	
		SITE	RAW WATER		TREATED		TREATED		TREATED	
		SAMPLE DATE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE	RESULT	REMARK CODE
VOLATILES	TETRACHLOROETHYLENE (UG/L)	93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.050	<W	.050	<W	.050	<W	.050	<W
		93/02/26	.050	<W	.050	<W	.		.050	<W
		93/03/11	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/07	.050	<W	.050	<W	.050	<W	.050	<W
		93/04/20	.050	<W	.050	<W	.050	<W	.050	<W
	TOLUENE (UG/L)	93/01/14	.050	<W	.100	<T	.100	<T	.050	<W
		93/01/21	.050	<W	.		.050	<W	.	
		93/02/10	.050	<W	.100	<T	.050	<T	.050	<W
		93/02/26	.050	<T	.050	<T	.		.050	<T
		93/03/11	.050	<T	.050	<T	.050	<T	.100	<T
		93/04/07	.050	<W	.050	<T	.050	<T	.050	<T
		93/04/20	.050	<W	.050	<T	.050	<W	.050	<W
	TOTL TRIHALOMETHANES (UG/L)	93/01/14	.500	<W	8.050		2.250	<T	.700	<T
		93/01/21	.500	<W	.		.500	<W	.	
		93/02/10	.500	<W	2.600	<T	1.300	<T	1.200	<T
		93/02/26	.500	<W	1.100	<T	.		1.250	<T
		93/03/11	.500	<W	2.700	<T	1.400	<T	2.050	<T
		93/04/07	.500	<W	.500	<W	1.200	<T	1.950	<T
		93/04/20	.500	<W	.550	<T	12.200		18.650	
	TRICHLOROETHYLENE (UG/L)	93/01/14	.100	<W	.100	<W	.100	<W	.100	<W
		93/01/21	.100	<W	.		.100	<W	.	
		93/02/10	.100	<W	.100	<W	.100	<W	.100	<W
		93/02/26	.100	<W	.100	<W	.		.100	<W
		93/03/11	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/07	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/20	.100	<W	.100	<W	.100	<W	.100	<W
	VINYL CHLORIDE (UG/L)	93/01/14	.100	<W	.100	<W	.100	<W	.100	<W
		93/01/21	.100	<W	.		.100	<W	.	
		93/02/10	.100	<W	.100	<W	.100	<W	.100	<W
		93/02/26	.100	<W	.100	<W	.		.100	<W
		93/03/11	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/07	.100	<W	.100	<W	.100	<W	.100	<W
		93/04/20	.100	<W	.100	<W	.100	<W	.100	<W

CODE INTERPRETATION:

<T - LOW VALUE TENTATIVE: FOR INFO ONLY	< - ACTUAL RESULT < THAN REPORTED VALUE
<W - 0 VALUE IS MIN. MEASURABLE AMOUNT	<=> - APPROXIMATE RESULT
A3C - APROX RSLT:TOTAL CNT EXCEED 300 COL	!IS - INSUFFICIENT SAMPLE
CRO - CALCULATED RESULT ONLY.	!NP - NO PROCEDURE
NAF - NOT ALL REQUIRED TESTS FOUND	!QU - Q/C UNACCEPTABLE
RRV - RESULT VERIFIED BY REPEAT ANALYSIS	!WP - WRONG PRESERVATIVE